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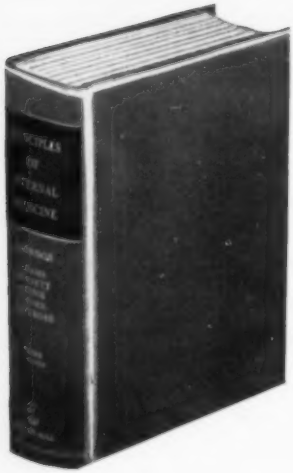

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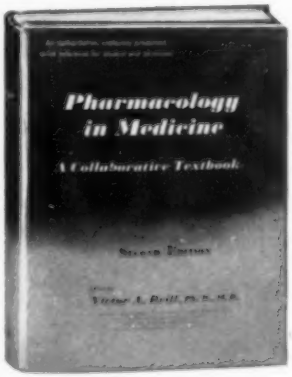

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News from the Medical Schools: Material for this section should be transmitted to the News Editor, Mr. Tom Coleman, 2530 Ridge Avenue, Evanston, Illinois. Announcements of major faculty and administrative appointments, news of distinguished visitors and significant educational developments will be included. It is not possible to publish notices on grants-in-aid for scientific research.

Items of Current Interest: Audio-visual news and notices from national and federal agencies appear n this section.

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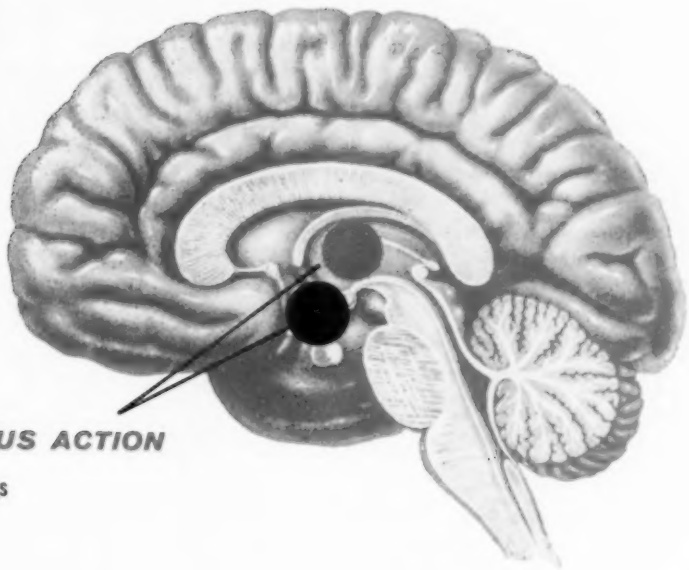

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AMERICAN COLLEGE OF CARDIOLOGY, Benjamin Franklin Hotel, Philadelphia, May 26–29. Dr. Philip Reichert, 480 Park Ave., New York 22, Secretary.

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AMERICAN OPHTHALMOLOGICAL SOCIETY, The Homestead, Hot Springs, Va., May 28–30. Dr. Maynard C. Wheeler, 30 West 59th St., New York 19, Secretary.

AMERICAN TRUDEAU SOCIETY, Palmer House, Chicago, May 25–27. Dr. E. P. K. Fenger, 1790 Broadway, New York 19, Secretary.

AMERICAN UROLOGICAL ASSOCIATION, WESTERN SECTION, Monterey, Calif., May 17–21. Dr. James Ownby, Jr., 516 Sutter St., San Francisco, Registration Chairman.

NATIONAL TUBERCULOSIS ASSOCIATION, Palmer House, Chicago, May 24–29. Mrs. Wallace B. White, 1790 Broadway, New York 19, Secretary.

SOCIETY OF AMERICAN BACTERIOLOGISTS, Sheraton Jefferson Hotel, St. Louis, May 10–15. Dr. E. M. Foster, University of Wisconsin, Madison 6, Wis., Secretary.

JUNE

AMERICAN ACADEMY OF TUBERCULOSIS PHYSICIANS, Atlantic City, N.J., June 6. Dr. Oscar S. Levin, P.O. Box 7011, Denver 6, Secretary.

AMERICAN COLLEGE OF ANGIOLOGY, WORLD CONFERENCE ON ANGIOLOGY, Marlborough Blenheim Hotel, Atlantic City, N.J., June 5–7. Dr. Alfred Halpern, 11 Hampton Court, Great Neck, N.Y., Executive Secretary.

AMERICAN COLLEGE OF CHEST PHYSICIANS, Atlantic City, N.J., June 3–7. Mr. Murray Kornfeld, 112 E. Chestnut St., Chicago 11, Executive Director.

AMERICAN DERMATOLOGICAL ASSOCIATION, Claridge Hotel, Atlantic City, N.J., June 1–4. Dr. Wiley M. Sams, 25 Southeast 2d Ave., Miami, Fla., Secretary.

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AMERICAN GASTROSCOPIC SOCIETY, Atltantic City, June 7. Dr. Arthur M. Olsen, 200 First St., S.W., Rochester, Minn., Secretary-Treasurer.

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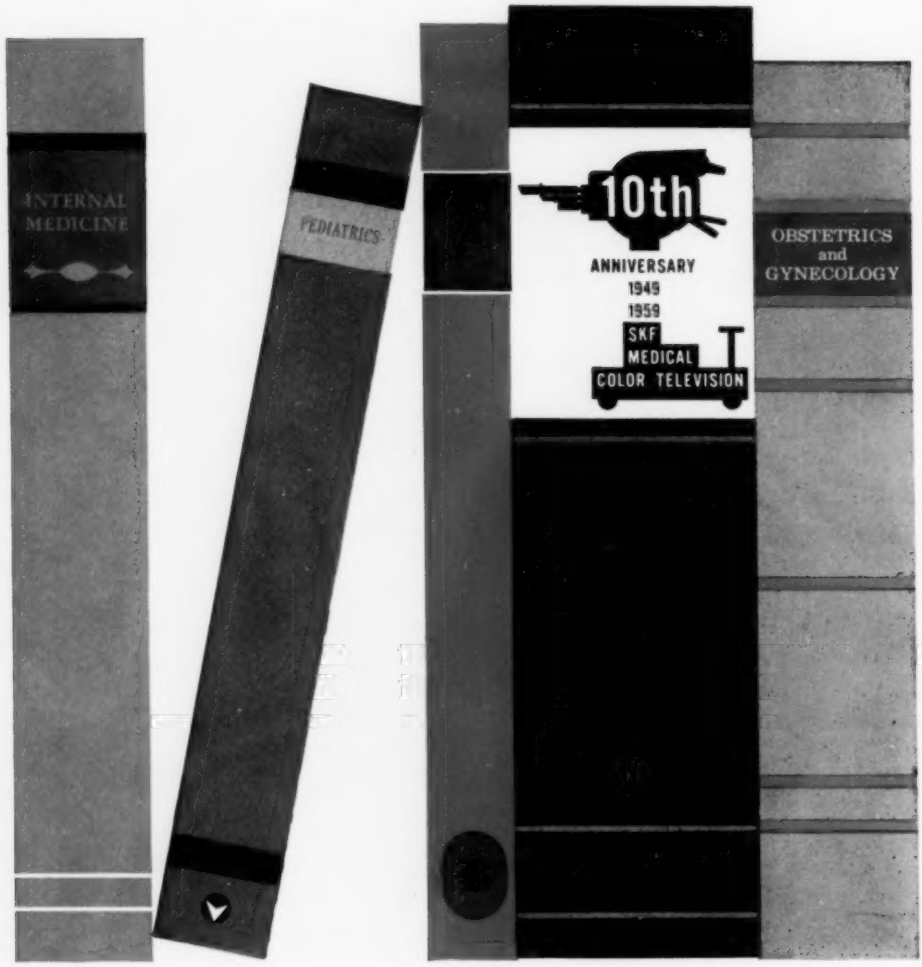

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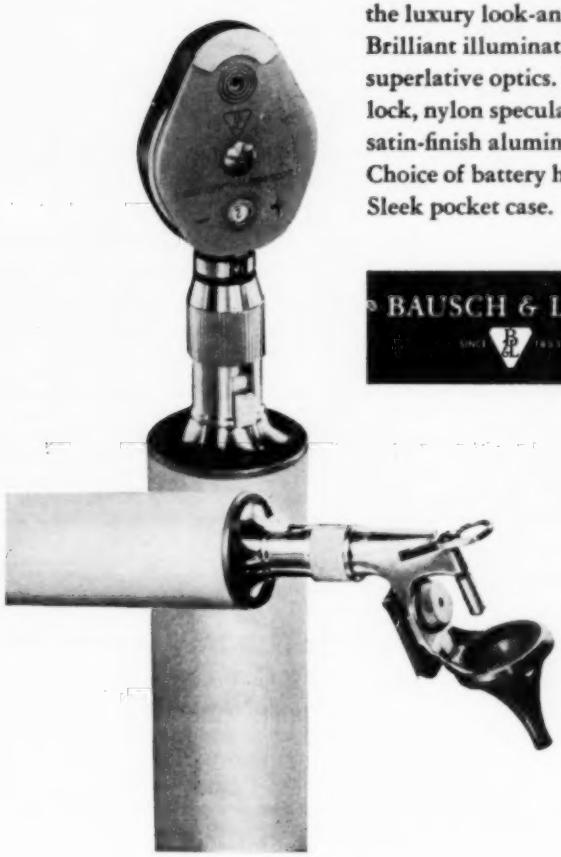

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In this experiment at the National Heart Institute a researcher compiles data on the work of breathing. He is studying resistance to air flow within the respiratory passages of a model human lung.

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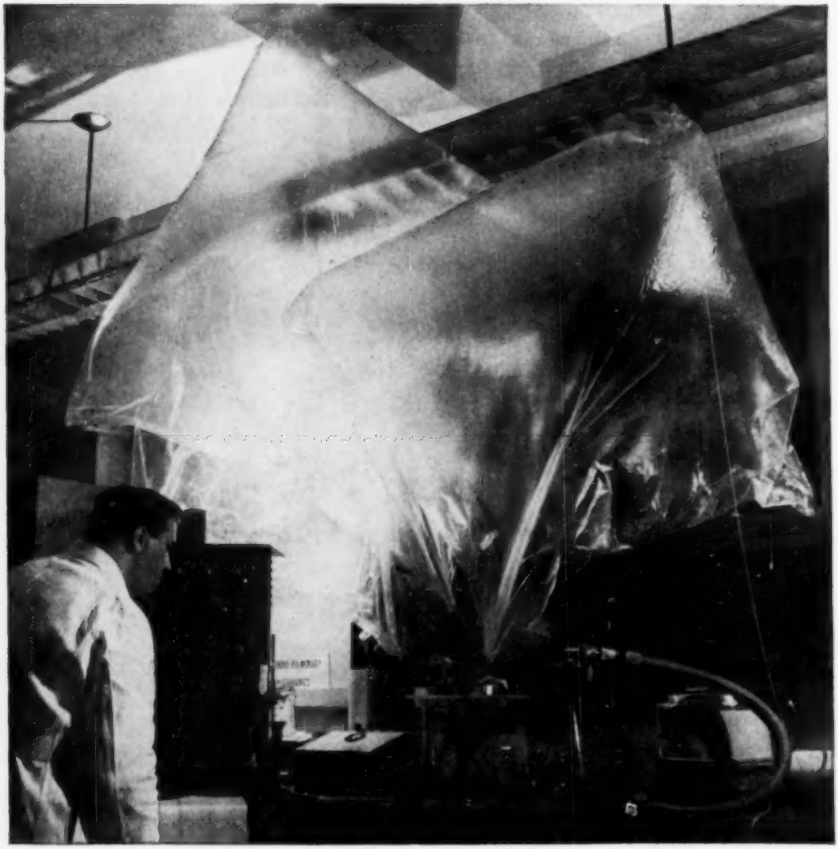
Basic studies such as this are advancing our understanding of the physics and chemistry of normal and impaired pulmonary ventilation. Lakeside Laboratories, Inc., Milwaukee 1, Wisconsin.



THERAPEUTIC DIRECTION THROUGH BASIC RESEARCH

LAKESIDE

A Summer Institute on Medical Teaching
Report of a Conference*†

GEORGE E. MILLER, M.D., and EDWIN F. ROSINSKI, ED.D., EDITORS
University of Buffalo, Buffalo, New York

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THE BACKGROUND

The pre-eminence of American medicine is acknowledged around the world, and it is to America that the world turns for leadership in medical education. However, in America itself the medical schools and the educational programs they offer have for a decade been subjected to a soul-searching self-examination that is without precedent. There is a healthy belief that the apogee of medical education has yet to be achieved and a vigorous desire to get about the business of moving more swiftly toward that probably unattainable goal. Along the way the relationship of liberal arts to medicine,

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† The Institute was a part of the University of Buffalo Project in Medical Education which has been supported by the Commonwealth Fund.

the selection of students for medical school, the ecology of those students, the content and sequence of the medical school course of study, the contributions of the paramedical disciplines of psychology and sociology and anthropology to medical education, and the financial support of medical school educational and research responsibilities have all been subjected to attack or study. Out of this ferment has come change which all but a handful of dissenters regard as progress. However, in the midst of this upheaval one segment of the complex program has largely escaped either systematic study or change. This is the teacher. Almost alone the University of Buffalo Project in Medical Education has focused attention upon the preparation and role of the medical school instructor in the belief that the keystone in the educational arch should not be overlooked.

This conviction did not develop overnight. It grew slowly over a period of 3 years, during which a small faculty group under the aegis of Dr. Edward M. Bridge, Professor of Pharmacology, met regularly in a seminar to discuss problems in medical education. Like faculty groups in many medical schools during the early 1950's this one was critical of the educational program for which it was in part responsible and dissatisfied with past efforts to perceive the shortcomings and to take action in their correction. The group was united in a belief that the problems of medical education were largely curricular and that the achievement of a proper sequence and content of courses would be followed by a major improvement in the program of instruction. They were delighted when some of their proposals were accepted, but, like their counterparts in other schools, they were puzzled several years later in the realization that some of those curricular proposals which had been so splendid in concept had lost their glow in execution. In some instances the students had a quick and ready answer to the question. It was not pleasant to hear them recite the failures of faculty performance in these courses, yet honesty demanded that the comments be regarded with interest and with concern. The faculty which looked closely for itself could see that there was merit and reliability in the students' observations.

But how could it be otherwise? It is no secret that members of a medical faculty come to their teaching responsibilities magnificently prepared as physicians or scientists, but with no preparation except knowledge of subject matter for the task of instruction. There are many who would argue that this is all that is required. Even these, however, will acknowledge the occasional investigator of great brilliance who is scarcely able to communicate with his peers and totally incapable of communication with his students. Many more, in the quiet of reflection, would agree that there is no good correlation between the skill of a teacher and the amount of information he possesses above that which is the minimum acceptable for a faculty appointment.

If an instructor's knowledge and his teaching skill cannot be equated, as it is surely evident that they cannot within the limits noted above, then it does not seem illogical to determine whether those already possessed of an adequate body of information might improve their proficiency in teaching by study of the process of teaching and learning. Persuasive as this argument may appear, it is not one that has great appeal for members of most medical faculties. At the first Teaching Institute of The Association of American Medical Colleges participants were asked whether they had received instruction in pedagogy prior to their initial faculty appointment. Three-quarters of the Ph.D.'s and nine-tenths of the M.D.'s gave a negative response. They further indicated that if such instruction meant an encounter with a professional educator they would prefer not to have it, although some would welcome the guidance of more experienced colleagues. Despite the solidity of this antagonism to the educationist it was the belief of a minority group at the University of Buffalo School of Medicine that the hypothesis had not been ade-

quately tested, that the response was based more upon emotion than reason, and that there was little to be lost in an investigation of the light a professional in education might shine upon the problems of instruction in medicine.

This was the background for a series of seminars on the Teaching-Learning Process conducted in 1954 for these twelve instructors by the late Dr. Nathaniel Cantor, Professor of Sociology and Anthropology and devoted student of the dynamics of learning. The outcome of the experience was published in 1956 as "Adventure in Pedagogy" (5) and attacked 9 months later as "Disaster in Pedagogy" (4). Adventure or disaster, it was interpreted by those responsible for the series as sufficiently rewarding to merit a more elaborate trial. The School of Education whose cooperation was next enlisted agreed that the proposal of a joint study was an exciting and unique challenge, but the fact of the matter was that no one in that faculty knew anything about medical education. In addition, there was no certainty that their body of information and skills would be useful in the solution of educational problems in a professional school, although there was good reason to believe that educational principles were applicable at any level; but they were willing to find out.

During the next year the professional educators spent many hours in the medical school. Under the guidance of their opposite numbers in medicine they attended lectures, observed laboratory exercises, visited wards and clinics, viewed conferences and seminars, studied the nature and setting of education in medicine. At the same time their medical associates learned some of the language, the concepts and the value systems of the world of education. It was a year in which the antagonisms, hostilities, anxieties, and misunderstandings, as well as misinformation, between the two professions were dispelled. When it was done, both sides were convinced that the Project in Medical Education was sound in concept and that the body of material upon which it was built was appropriate.

By design the project was a study in depth rather than an attempt to influence broadly the teaching practices and attitudes of an entire faculty. During the first year seven medical teachers, four from Buffalo and three from other medical schools, devoted nearly half-time to the intensive course of study. A similar group was selected for the second year. Their activities included three 2-hour seminars each week throughout the academic year, a series of special observation and practice teaching sessions, as well as the collateral reading which was designed to add to their information and understanding of education as a process, in the specific context of medicine. These seminars and workshops were jointly led by an expert from education and a member of the medical faculty who had evinced interest in the topic and whose function was to maintain the focus of discussion upon the problems of medicine. Most of these leaders were the same as those who are listed in the leadership group of the Summer Institute. The topic areas for which they assumed responsibility were also the same.

The Educational Research Center of the University of Buffalo was charged with the evaluation of this program. Their study was conducted independently. As a general rule the most important thing to know about any change in a teacher's activity is whether it helps his students to learn more rapidly or more efficiently. Because only seven instructors in a faculty of well over 500 were involved in this program during each of the first 2 years, and because their encounters with students represented such a minute segment of the total student-faculty contact, such an evaluation was not feasible. Instead, the assumption was made that change in faculty attitudes and practices, in the direction planned by this program, would be reflected in a change in student learning. The justification for this assumption was taken from studies at other educational levels where the relationship had been satisfactorily established. The pri-

mary focus of evaluation was then upon the attitudes and secondarily upon the teaching practices of the participants, each of whom was the subject of an intensive case study. Initial attitudes were identified during a prolonged structured interview taped, transcribed and subsequently analyzed by independent observers. Throughout the year attitudes were elicited through interim interviews and log-diaries kept by each participant. A terminal interview was used as a final device for attitude expression. The analysis of these data has made possible certain generalizations regarding the outcome of the experience. To cite a few:

1. There was a tendency for all participants who were quite one-sided in their point of view about education to modify the extremeness of this view.

2. In all cases participants evidenced a markedly increased awareness of the variety of techniques available for use in the teaching-learning process, as well as a realization that these techniques are both accessible and useful to medical school instruction.

3. In most cases participants developed some further adeptness in handling these new techniques.

4. In all cases participants have come to recognize that no technique is "good" or "bad" in itself.

5. The vital role of objectives in medical education was studied and understood by all.

6. The participants came to a clearer understanding of the breadth of medical education and the contribution which can be made to the whole by both basic and clinical sciences.

7. The participants tended to develop greater understanding of the respective roles played by subject matter and instructional skills in the development of the successful teacher.

It is clear that judgments are involved in these generalizations. The judgments are those of the Educational Research Center and are based upon their beliefs and their biases which may or may not reflect those of the medical profession. They are, however, the result of a careful analysis of voluminous data which can be examined by others (7). However, supporting the point of view which is represented in these generalizations is a similar conclusion derived from a less precise but equally compelling principle of evaluation: "A difference, to be a difference, must make a difference." At the end of the basic study each participant was convinced that the experience had made a difference to him as a teacher and as a person. A 1-year follow-up of the first seven participants provides ample data in five instances to confirm the conclusion that the identified changes in attitudes would carry over into teaching practices.

It was this experience, and these preliminary data, which encouraged the development of a less time-consuming and less expensive mechanism by which larger numbers of medical teachers might share a similar opportunity to learn more about education as a process, and particularly that process which is medical education. Out of the experience accumulated in the 2-year study it was possible to identify the topics in each major subject area which had produced the greatest impact upon participants, as well as those topics which had been of greatest practical usefulness. The leadership team was more sophisticated in the combined area of medicine and education, and the stage was set for a new venture.

The Summer Institute on Medical Teaching is that venture. It is hoped that insofar as words permit the pages which follow will convey some of the content and the atmosphere of the conference. The workshop setting introduced great flexibility and made it possible to consider not only those problems which the leaders thought fitting but also those which the participants found troublesome. As a result, each chapter represents a synthesis of ideas which emerged from the exchange rather than a formal presentation by the leaders alone. If there are errors in the transcription from tape to type the editors must assume responsibility, but they believe that they have faithfully conveyed the spirit as well as the substance of the Institute.

THE MEDICAL SCHOOL IN PERSPECTIVE

If this presentation appears to be no more than reiteration of the obvious, it can be defended only because the obvious is so often overlooked, and the conclusions which might be drawn from the obvious are so commonly ignored. Our task is to delineate the framework of the total educational system within which a school of medicine must operate, and to indicate the influence this structure exerts upon the basic orientation of medical education as well as upon the practices of medical teachers.

It might be well to begin with one of the most conspicuous facts which is that the raw material for the educational program in medicine comes to the medical school only after 15–17 years of antecedent schooling. The medical faculty, being fundamentally no different from other faculties, typically believes that, if those who had taught the students earlier had done a better job, then the task of the medical school would be simpler and the broad purposes of education better served. There is, in fact, scarcely anyone in recent years who has not had something to say about the nature of elementary and secondary education, particularly about its shortcomings. Since we are in the midst of a great national debate on this topic it might be well to examine closely this schooling which is the culture medium from which medical students emerge.

Perhaps the most significant observation to be made is that we do not have a national system of education. The Federal government says that schools cannot operate counter to the Constitution, but with this exception public education in America is exclusively regarded as a state function. However, in most instances the state has delegated this responsibility to the thousands of local school boards that dot the country. It is the people selected from these local districts to serve on the school board who exercise fundamental control of the school system. This means that there is great diversity, particularly in quality, in American elementary and secondary education; but, even more significantly, it means that whatever is done in a school comes out of the culture, the mores, the attitudes of the people as a whole. In recent times we have heard suggestions that this is wrong, that a national system of education should enforce standards upon all schools. Should this happen it would represent a complete reversal of the historic policy that has existed for 300 years.

The elementary school is nearly as old as the American people. It was shortly after the colonists arrived in Massachusetts that a school was established by law. These colonies were basically a theocracy. The religious conviction of the Puritan colonists required that each person be able to read the Bible in order to make decisions regarding his relationship to God and his fellow man. And thus a system of universal education through public schools had its beginnings in 1647 under what is known as the "Old Deluder Law." It was by this education that the young people learned to read and to overcome the old deluder, Satan. The original objective was literacy, and this has remained a fundamental objective of the elementary school to this day. Through the years this objective has been expanded and elaborated upon but the historical purpose has never been replaced. This means that the elementary school must deal with subject matter. This it does whether it is "progressive" or a "traditional" school, although the orientation may influence the format in which this subject matter is presented.

Only a few years after the colonization of New England a college also appeared. Like the elementary school it was established to serve religious ends. In a theocracy the people needed an educated ministry, and to get one they established Harvard College. By the end of the colonial period a great many other colleges had been established, but their mission is clear in the fact that only one college president prior

to 1789 was other than a theologian. With such a mission the college curriculum was established upon the firm foundation of classical and humanistic subject matter, for it was through Latin, philosophy, and theology that a better ministry could grow.

The gap between the elementary school and the college was filled by a grammar school that was also provided for in the law of 1647. Such institutions as the Boston Latin School were designed to offer to a select body of students a classical preparation for college. This system, which was not very elaborate, very effective, or very good persisted almost unchanged until the 19th century, when the efforts of many men, among whom were Henry Barnard and Horace Mann, led to a great ferment in education out of which developed the idea of extending the education of all young people through the high school level. During the latter half of that century and early years of this one the secondary school came increasingly to be regarded as an institution of broader purpose and greater scope than college preparation. It became a symbol of the hopes and aspirations of a democratic people, and beyond symbolism was the instrument by which each man could become more than otherwise he might have been. A landmark in this changing concept was the 1874 court decision which established the secondary school as a tax-supported institution, a part of the common educational system of the nation under the control of the local community. Through this development the secondary school became the great social instrument that it is today. It is to the school that society turns when it wants to bring about change. If tens of thousands are killed on the highways each year because the automobile is inexpertly used, if automobile sales are threatened and insurance rates elevated because of this toll, what step is taken? We look to the schools to train young people to become better drivers, to acquire habits of safety and attitudes which will reduce this carnage. Today the schools are told to produce more scientists; yesterday the emphasis was upon American history; and the day before they were instructed to improve the physical fitness of our young men. The schools are under constant and intense pressure to meet the immediate apparent social needs of the community.

Coupled with this broad social nature of the schools, however, and arising out of the Judaic-Christian ideal and ethic, is our democratic concept that each individual must be given the opportunity to develop his capacities to the full and our belief that he can achieve this primarily through education. We join these purposes of social welfare and individual opportunity by saying that the social welfare is best served by giving *every* child, not just a particular group of children, this opportunity to advance. This privilege of each individual to receive 12 years of education is the mechanism we seem to have invented by which we as a whole people are to advance ourselves. In a sense this means that the purposes of the secondary school have become identical to those of the elementary school. What was once done in 8 years is now done in 12. Whereas the secondary school once enrolled a select group of individuals who were preparing themselves for college, the elementary and secondary schools can now be viewed together as a 12-year opportunity for everyone. There are those who believe that it would be better to send many youngsters out into the world at the end of 8, 9, or 10 years of schooling. There are many, however, who would regard this as a reversal of the deep-rooted democratic ideal that has been expressed, not through Federal dictate or State management, but by each community through its local Board of Education.

It is a common complaint that the secondary school has become so concerned with such things as driver training, home-making, life adjustment, that it no longer fulfills the goal of achievement in an academic sense. Such a criticism may be accurate and may also be quite proper; but for a large proportion of students the high school represents terminal education, and this calls

for a different kind of schooling than that which prepares a student for college. The objectives of a secondary school are multiple, and the total program must include an opportunity for *each* student to become what he is capable of becoming. For some this may be fulfilled by an academic curriculum. For others something quite different must be provided. The school will insist that it must meet the needs of all groups. Indeed, it will be rather impatient in resisting the pressure of any special interest group which wants the school to serve its particular purpose alone.

There is also the complaint that the secondary school aims for minimal or at best mediocre achievement, that there is no encouragement for students to excel. Yet it is true that our schools, as a result of the local pattern of control, are precisely what the people want them to be, and what the people want reflects clearly the nature of their leadership. If the climate of the school is anti-intellectual, it mirrors rather than creates the climate of the community. This is both the strength, and the weakness, of our public school system.

The college, too, has changed. As the pioneers moved westward the college went with them. It was usually founded and supported by a church group and was designed to serve religious needs. Built on the English system it was until the mid-1800's basically humanistic in its orientation, with a curriculum built upon the assumption that man is more than animal, that he is touched by and possessed by a divine spirit; that he has aspirations, hopes, memories, and an anticipated future; that his life is not fulfilled on earth alone; that, being this, he must be provided with an opportunity to think upon these things. The institutions which provided this opportunity were small, with pitiful libraries, and often with faculty members whose only qualification was the ability to read Latin. Until the time of the Civil War no college exceeded Yale in size, and the total enrollment at Yale was never much greater than 500.

In the middle of the 19th century significant events turned the tide of higher education. Through the Morrill Land Grant Act (1863) the Federal government gave large packets of property to foster the establishment of educational institutions. These were to further the needs of society through instruction in agriculture and the mechanical arts. When these institutions were founded it was realized that there was almost no subject matter to teach, and in order to gain content for the educational program the agricultural experimental stations were set up as a part of the land-grant institutions. Thus they became not only educational but also research institutions. Because their focus was upon agriculture and the mechanical arts, which were close to the needs of the people, they became highly popular service institutions as well. Many of them had splendid leadership, and out of this framework emerged particularly the great mid-western universities. In one sense their purpose was not greatly different from that of the elementary and secondary school: to serve the needs of the people and to provide an opportunity for each individual to achieve his greatest potential.

At about the same time, under the leadership of such men as Gilman at Johns Hopkins and Eliot at Harvard, a few institutions embarked upon a program of development modeled upon the German universities which place major emphasis upon graduate work and the research ideal. It is the amalgamation of the ideals of this Germanic model and that of the American land-grant institution that has led to the great American universities of today. They are not only the abode of scholars but are also large scale educational institutions that today attempt to meet the needs of 3,000,000 young people each year. As this growth has occurred they come more and more to resemble the elementary and secondary schools in their basic purpose.

At the same time this institution may be seen quite differently by a faculty. Let us review, for a moment, how a university

views itself. By one definition the university is a community of scholars which means that scholarship must dominate the institution. Scholarship is typically symbolized by the faculty of Arts and Sciences that extends upward to become the faculty of the Graduate School. The fundamental mission of a community of scholars is to encompass the world of knowledge and to advance it. The scholar is more than an experimentalist, more than a researcher. He is a student. Being this he is not only concerned with all knowledge, but also is the only one competent to say what scholarship is or what it should be about. The community of scholars, then, is self-controlling and responsible only to itself. It decides who is acceptable to the community and the criteria for acceptability. Society more or less accepts this definition, sometimes more and sometimes less; but when it is less, the whole community of scholars may rise as a body to prevent society from imposing its will upon them.

The main business of this community is scholarship or, in a narrower sense, research. Since the members of the community are mortal they must perpetuate themselves by the instruction of neophytes. And so they teach, but teaching becomes a secondary function of the true university.

Around this community which is represented by the College of Arts and Sciences and the Graduate School are clusters of other schools and colleges that are typically professional schools: business, engineering, law, medicine, social work, education are examples. The scholarly community at the center of this constellation may have pressure brought to bear upon it by society as a whole or by special interest groups, but it looks only to its own members to determine what business it should be about. For the professional school the dominant force is not the community of scholars, but the profession which the school represents. The value systems of a profession and a scholar are quite different. The scholar is devoted to knowledge. A profession is based upon the concept of service. While it renders this service, society delegates to the profession the right to determine its own membership, to select its own candidates, and to decide upon the nature of their training. Since this professional service is undergirded and supported by a body of knowledge derived from scholarship, it is logical to associate the professional school with the university which has scholarship as its chief business. However, this places the professional school in an anomalous position between the community of scholars, which presses it to become more scholarly, and the profession, which presses it to become more service-oriented with scholarship relegated to a position of handmaid to that service. Inevitably this leads to tensions, hostilities, and anxieties between the community of scholars and the faculty of a professional school.

In an American university an uneasy truce has been established, with the professional school overlapping to greater or lesser degree the central community. For some schools there is almost no overlap, while in others, such as Business and Engineering, the overlap is enlarging as their educational programs undergo a reorientation toward the development of scholarly graduates who are more than practitioners of a profession. In medicine the overlap has traditionally been greater than in most professional schools. The first 2 years are devoted almost entirely to scholarly pursuits in the basic sciences. In the medical school itself, however, a point of tension is established between the basic science and the clinical years, for the former are oriented more toward scholarship and the university community, the latter toward service and the professional community. This is manifested in the traditional antagonism between M.D. and Ph.D., which is basically a reflection of orientation. Now that full-time clinical faculty members are more and more shifting their orientation toward the ideal of the community of scholars, a conflict arises between them and their colleagues who are practitioners in the field. In a fundamental sense each of these con-

flicts represents impingement of the external force represented by the service-oriented profession upon the internal force of the scholarship-oriented university community. Each of them is a vital force, neither better nor worse, neither more nor less valuable than the other. But they do make life more difficult, and especially if the origin of the conflicts is not clearly recognized or is hidden by value judgments and emotion.

What, then, of the triad of commonly accepted responsibilities of the university: education, research (or, more broadly, scholarship), and service? It is here that a university, or an individual faculty member, must often make painful decisions regarding the proportions of time, energy, and resources which can be devoted to each of these. In the preceding paragraphs a set of criteria for the development of priorities in this schema has been developed. Since the university is a community of scholars and our civilization is utterly dependent upon the maintenance of this community, it would seem that scholarship should have the first priority. This is historically true and appears to be pragmatically correct. This means that teaching emerges from scholarship, since both the community and its ideals must be perpetuated. The concept of service is important and should be accepted to the extent that the community of scholars is the only body equipped to render a given service to society and can render it without compromising the integrity of the university as an institution. It is at this point that judgments are difficult. Should the university provide opera in the School of Music as a community service? Should it make surveys of public schools for the purpose of recommending the number of rooms and teachers and equipment the schools will need a decade hence? Should it make its laboratories and personnel available to industry for the solution of specific problems? If there are other agencies of society which can render these services they should perhaps be asked to do so. If the service can be rendered only by the community of scholars this may be a part of its responsibility.

Since the professional school is not congruent with, but merely overlaps, the basic university community of scholars, the objectives are not entirely the same and the pressures are even greater. For these schools are not only oriented toward service but have their roots in a concept of service. As long as they are staffed, as they should be, by the very best of the professional group they represent, there will be a continuing demand for certain kinds of service to come out of such a university division; but the university itself must resist, for if someone is not eternally vigilant our contemporary culture would shortly smother scholarship and teaching and leave a service institution which might temporarily meet social needs but could not long endure.

Finally, what are the respective roles of faculty and administration in this educational setting? The foregoing discussion clearly indicates that the faculty is at the center of the university. As a community of scholars it is self controlling and cannot directly be told by anyone what to do. As a collegium or community of equals they have their officers to carry out decisions. These are traditionally the deans and department chairmen. They are essentially servants of the faculty who act as executive secretaries in the service of this body of scholars which governs itself.

In the United States, unlike many other countries, legal authority for operation of the university has been vested in a Board of Trustees or Governors or Managers, distinct from the community of scholars. They hold title to the property, select the officers of the university, confirm appointments to the faculty and regard themselves as managers of the enterprise. Their agent in this operation is the President, who is assisted by a staff. As the university and its faculty grew larger and more complex, serving literally thousands of students, the need for certain ancillary services became acute. Because the university took in a lot of money and had to pay it out, a corps of accountants and clerks and purchasing and disbursing

agents were required to operate the business office under an institutional treasurer. Because many students had to be housed and fed, their health looked after, their lives sometimes regulated and governed and occasionally disciplined, an office of student affairs under the leadership of a dean appeared. The interpretation of the university to the public at large which was responsible for its support became a necessity, and, since knowing the way around Foundations and Federal agencies could lead to more support, public relations offices and development offices and offices of research grew up as extensions of the president's arm. As the library grew, and collections of books which ran into the millions had to be catalogued, housed, and kept in circulation, a whole covey of specialists under the librarian developed. Each of these agencies of administration began to be staffed by people professionally prepared to carry out their tasks. These offices operate as a bureaucracy, a way quite different from that of collegial administration.

The result is a tripartite organization in which each of the parts, the Board of Trustees and President, the Professional Services, and the Faculty, is both legitimate and useful. However, they often fail to understand one another. They have different ways of operating, different value systems, make different kinds of judgments; and the result is often conflict and confusion. The relationship of faculty to the administration and the professional services may become particularly confusing and indecisive. If the faculty as a traditional right decides that it wants to promote one of its members, what happens when the president declares that his is the legal responsibility for promotion and they disagree with the declaration? A conflict. Or when the faculty argues that too much attention is being devoted to football but the Board of Trustees indicates that athletic contests are good for public relations? A conflict. Or when the purchasing office indicates that it can get the same glassware cheaper from another company than that selected by a faculty member? The business officer thinks he is in a better position to decide because he is a specialist in purchasing. The faculty member replies that this is irrelevant, because he knows what he wants. Add to these the potential conflicts which might be generated by alumni and student body.

In the administration of a professional school the same kinds of problems may be encountered as in the management of a university. The department chairman is more likely to be the key man in the organization who may or may not look to his associates for the initiation of action or consult them before taking it. Nor is the dean of a professional school likely to be as much a servant of the faculty as would be the ideal in a traditional community of scholars. These matters vary from school to school, but in general the organization is less collegial than that at the core of the university. Yet the collegial organization will probably be the most effective in the long run. It may be slow-moving and a ponderous organism out of which to get decisions; but when change takes place it will be solid, and likely to last. This kind of organization makes the life of the administrator particularly difficult, for his task is to identify problems which require action, and the collegial organization demands his utmost patience in awaiting consensus and movement. It is true that the strong leader who does not await consensus may make changes quickly, but when he departs the structure he has built is likely to collapse.

In the collegial organization it is important for the faculty to recognize the difference between establishing policy and administering that policy. Unless this distinction is clearly drawn only further confusion will result. It is the faculty alone which can determine the qualifications which make a candidate acceptable for admission. However, the identification and judgment of these qualities may require special skill as well as an abundance of time which only the admissions officer can give to the problem. If he rejects Joe Doakes on the basis

of evidence, it is at least disrupting for the faculty member to protest "But I *know* Joe and his family, and he is a good candidate for admission." Such a failure to distinguish between policy establishment and administration begets only confusion and sometimes hostility. The collegial organization requires confidence: confidence by the administration that the faculty can establish policy, confidence by the faculty that the administrator will carry out, not pervert, the policy they establish. It is the absence of this mutual trust and confidence which gets in the way of successful operation. Where trust is lacking, a major contributing factor is often inadequate understanding of and respect for the problems of others.

Such is the setting of higher education as a whole, within which the professional school must operate. The teacher of medicine may disagree with the concepts that have shaped the elementary and secondary schools, or with the historical and practical considerations that underlie the management of universities and professional schools. But he cannot ignore them, for they have fashioned his students as well as his surroundings.

PROBLEMS IN LEARNING

Professor A is a physician and a distinguished investigator. He has been teaching for 20 years and for 5 has headed a basic science department in the medical school of a great university. Although the course of instruction offered to medical students by this department is modified from year to year to include the most recent developments in the field, the general pattern is by now well established. To each of his associates Professor A has assigned responsibility for a specific segment of the course, a segment that represents one of the well defined subdivisions of the broad discipline. He has retained for himself that area in which he has achieved fame through his research. The professor cautions each of these department members to remember that he has a great deal of information to cover and that the introduction of clinical material, except in the most casual fashion, will both distract the student and waste the already inadequate time to familiarize himself with the fundamentals of the science. It is this process of familiarization which the department holds as its objective. The clinical applications the students will find in the subsequent years of their medical school careers.

In order to achieve this coverage in one term the three 4-hour sessions each week are generally divided into a lecture hour, followed by a 3-hour period of laboratory work. Once each week small student groups meet with one instructor in a conference to discuss the laboratory experiments which have been completed. The list of lecture topics is given to the students on the first day, and reading assignments from the standard text selected by the professor are indicated at the same time. A laboratory manual is also provided. It gives a detailed outline of the procedure to be carried out in each laboratory session, the kinds of data to be recorded, the way in which they should be analyzed and reported.

In his introductory lecture Professor A tells the students that there will be interim examinations at 3-week intervals and one final examination. The interim examinations will cover only the material included in that 3-week period of lectures and laboratories. The final examination will cover the entire course. The examinations will be marked and the marks posted, but the examinations themselves will not be returned. The final grade for the course will be determined 25 per cent from the final examination, 50 per cent from the interim examinations, and 25 per cent from the laboratory performance. He invites any student interested in pursuing a special project in the field to consult with him at any time, since summer positions in the laboratory are available. It is unfortunately true, he adds, that the body of material to be cov-

ered in the course is so great that opportunity for pursuit of individual interests cannot be provided during the regularly scheduled course time.

Professor B is also a physician and a widely admired investigator. Like Professor A he has taught for 20 years, during the last 5 of which he has also headed a basic science department in the medical school of another university. Unlike the practice in the department of Professor A the course of instruction offered to medical students by his department is quite different from year to year and student to student, although the broad outline and purpose does not change. Professor B recognizes the efficiency of apportioning the well defined subdivisions of the field to the several members of his staff, but he asks that they be responsible for a different area each year. What he asks his staff to do he also does himself. He points out to his associates that, while their scientific discipline is independent and is justified by more than its relationship to medicine, it is not necessary to convince medical students that this is so. Instead, the relevance of this science to clinical problems should be a constant guide to their instruction. Since the subject matter of the field is obviously too great to compress into three 4-hour sessions a week for one term, those areas of greatest relevance to medicine and interest to the *medical* students should receive major attention.

To achieve this goal each 3-hour laboratory is preceded by a 1-hour lecture. The schedule of lectures, however, is rather flexible in order to provide time for a recapitulation of things which appear to trouble students, or to introduce new material at a time when their interest is particularly high. Each week one of these lecture hours takes the form of a clinic in which the specific problem of a patient is presented and analyzed in terms of the basic science contribution to its understanding or solution. Both students and faculty are expected to participate in this analysis.

The first 3 weeks of laboratory work serve as an introduction to the facilities of the laboratory and the basic techniques of the discipline. Toward the end of this period the students in small groups are asked to pose problems which trouble them, develop hypotheses, design methods to test the hypotheses, accumulate and analyze the test data, and from this draw conclusions. In this effort they have the assistance, advice, and guidance of the instructional staff, who are available during each of the laboratory periods to be of whatever help they can. As each series of problems is completed the students present their data for critical discussion by classmates and members of the departmental staff.

During his introductory lecture Professor B indicates that there will be interim examinations at 3-week intervals and a final examination at the conclusion of the course. Any of the examinations may include any material that the students have had in any course up to that moment. Immediately following each examination the staff will review and discuss the questions with the students. The papers will be marked and returned but the only grade given will be satisfactory or unsatisfactory. As a result of the examinations and the work in the laboratory his strengths and weaknesses will be discussed with each student at regular intervals.

These portraits are drawn from life. Although Professor A may be seen more frequently than Professor B, their like will be found in medical schools throughout the land. Nor are these respected faculty members creatures of whimsy who have developed such different courses lightly or without purpose. Each has compelling reasons for the design he has selected, reasons that depend upon beliefs about the way students learn. But in truth these beliefs may be no more than assumptions, often not verbalized, occasionally not even conscious. Nonetheless, it is possible to identify these assumptions from the teaching behavior that each exhibits. Once identified, the assumptions are more amenable to examination and study.

In Table 1 are some of the assumptions,

conscious or unconscious, unspoken or verbalized, which must lead Professor A and Professor B to teach as they do. If the reader reacts to this listing with a sense of outrage, a feeling that Professor A, whose practices appeal to so many teachers, has been libeled, he may take comfort in knowing that this is the first response of many medical instructors. It is inaccurate, the dissidents say, to conclude from his behavior that Professor A believes that "goals should be teacher-determined," for every teacher knows that the students' goals are determined by the fact that he has come to medical school. However, in each of these examples it is important to look also at the assumption drawn from Professor B's behavior. In this instance his practice suggests that he believes, "... that a learner should have a major share in setting up *individual* goals in a *particular* course in accordance with *his* purposes." It does not say that the student should set up the objectives, but that teacher and student together should identify the goals and work toward their achievement. It implies that objectives may be different for different students. Professor A may agree to this in the faculty room in an abstract discussion of medical education, but in the classroom, in his course, the goals and the course of study are determined long before the student appears. Professor A makes these curricular decisions because he believes that learning will be more efficient and more effective if the faculty alone selects the content and designs the course of study. He is sharply critical of Professor B for allowing students

TABLE 1

ASSUMPTIONS ABOUT LEARNING

Professor A assumes:	Professor B assumes:
That goals should be teacher-determined.	That a learner should have a major share in setting up individual goals in a particular course in accordance with his purposes.
That the main objective of learning is to acquire a body of predetermined content.	That the main objective of learning is to help each learner assume an increasing responsibility for his own learning.
That all learners need the same body of content.	That course work for a particular learner cannot be rigidly structured in advance.
That information is more important than the process of learning.	That acquiring proficiency in meeting ever-changing situations is to be stressed along with information.
That education is primarily an intellectual process.	That all aspects of the individual—physical, intellectual, social, emotional—affect learning.
That students do not know what they want or need.	That helping students recognize their needs and wants is part of the job of a teacher.
That information learned in school will be used when a situation presents itself where such information is needed.	That, since problems change, experience in how to attack new problems in the light of basic understandings helps a learner continue learning in an area after the support of a teacher is withdrawn.
That a teacher's primary responsibility is to know subject matter and present it in an organized manner.	That a teacher's primary responsibility is to help a learner learn subject matter and identify important problems he faces or may face so he may improve the processes needed to solve them.
That a learner's primary responsibility is to grasp information the teacher says he should learn.	That a learner's primary responsibility is to acquire understanding of facts and principles he will need in attacking problems.
That evaluation is exclusively the job of a teacher.	That evaluation is a joint responsibility of students and teachers.
That a teacher is responsible for a student's acquiring of knowledge.	That a student is responsible for acquiring his own knowledge.
That students must be coerced into working on some tasks.	That learning is a personal activity in response to challenge.

to participate in the definition of course goals and content and to pursue different courses of study, since this means that all students may not get the basic body of subject matter which is essential. Professor A is also quite sure that few medical students are sufficiently mature to know what they should have. Professor B's response to this criticism is a question: "When *does* a student begin to assume responsibility for his own learning: when he is a junior, a senior, an intern, a resident?" Those who concur with Professor A's insistence that we must protect students from their own immaturity are clearly operating under an assumption that goals must be rigidly defined for students, as well as the assumption that students do not know what they want or need. Those who concur with Professor B are surely operating under the assumption that helping students to recognize these wants and needs is an important part of the professional responsibility of the teacher. When Professor A's supporters cry out that B obviously does not think information is important, they can only be referred back to B's performance which reveals his assumption that information is only one of several objectives that share major importance.

As such discussions proceed they are inclined more and more toward emotionalism and the designation of one of these Professors as "good," the other as "bad." This succeeds only in evading the issue, which is to identify the assumptions, the "beliefs" about the way students learn, which lead each teacher to perform in the manner he does. It is only after the assumptions are identified that it is possible to ask whether they can be confirmed or denied by data derived from carefully designed and scientifically controlled study. If there are no data, then Professor A and Professor B will be forced to continue to teach as they do, supported only by faith in the propriety of their beliefs.

There are, in fact, great volumes of data and of opinion. Those who examine the data and opinions, however, find themselves in a quandary. Among learning psychologists there is great diversity of opinion and no little disagreement. There are many reasons for this that are important to appreciate if the findings and conclusions are to be interpreted in a reasonable way. Disagreement sometimes develops from the differences in experimental design. Some learning psychologists draw their conclusions from the salivation response in a dog, others from actions of a rat in a maze or a cat in a puzzle box. If their studies are based upon human behavior it is ordinarily through the observation of some minute physiological response from which generalization is at best difficult. Disagreement may result from the varied purposes which prompt the theorist to study learning. Most investigators are interested in adding to the sum of scientific knowledge in psychology, very few are interested in influencing educational practice. Disagreement may also develop from the theoretical assumptions with which they approach the problem of learning: the associationists, the gestaltists, the neurophysiologists—each operate within a specific frame of reference, and these have little in common. But the major factor accounting for difference of opinion is ignorance. Despite all the data that have been accumulated about learning, understanding of this complex phenomenon is very limited.

Where does this leave the teacher faced by students who want to learn? It places him in much the same position as the physician faced by patients who want their health restored. Both the physician and the teacher depend upon the research laboratory for the elaboration of principles upon which the successful practice of their profession is built. The physician relies upon the biochemist, the pharmacologist, the microbiologist. The teacher must depend upon the learning psychologist, the cultural anthropologist, the sociologist. Because the biological scientists have not found answers to all the problems in medicine, the physician does not throw up his hands in despair. He examines the data and makes the best possible use of the available evidence. Because the learning psychologists have not

found all the answers to the problems of learning the teacher cannot cease to function. It is his obligation to review the evidence and to build some working psychology of learning. It may not be as rigorous as that of the laboratory, and it must be realistic in terms of the classroom. It is only by such effort that his assumptions, and his behavior, will be based upon something more solid than faith alone.

After examining the evidence that has been developed through a variety of techniques, by investigators of many theoretical orientations, it *is* possible to make a few generalizations about learning which may be useful in every day teaching:

1. *What is learning?*—Learning is a hypothetical construct that is always *inferred from behavior*. Recent data gathered by neurophysiologists suggest that whenever learning takes place there is a modification of neural activity and perhaps of neural structure; but this is not a matter of general agreement, nor is it by itself useful in the classroom. If learning must be inferred from behavior, then the measurement of learning is an indirect measure through performance. The fact that the measurement is indirect does not mean that it is inaccurate. It should, however, introduce certain reservations and questions about the interpretation of data accumulated through such devices as achievement tests. The successful reproduction of a body of information, for example, does not necessarily indicate that the behavior of the individual will be different from that which was present prior to this achievement. This reservation does not mean that achievement tests are useless. It does mean that they should not be overinterpreted.

These observations also throw into sharp focus the fact that learning is an individual matter and that it is done by the learner. Learning is not achieved by magical transmission from the teacher. The learner must himself go through the motions of learning, and this includes making his own mistakes.

2. *What kinds of learning are there?*—There is no evidence yet available to suggest that there is more than one kind of learning. There is suggestive evidence that there may be some difference between early learning, primitive learning of children, and that of adult life in the sense that children are learning basic things and adults are making combinations of these beginning learnings. If true, this may be a quantitative rather than a qualitative difference, and to this extent adult learning should be more rapid.

When the goals of an educational program are listed they ordinarily include the accumulation of information, understanding, skills, and attitudes, but there is no evidence to show that their acquisition involves any fundamental differences in the learning process. It is true that teachers are a good deal more skillful in directing learning in the area of knowledge than in that of attitudes. But there is ample evidence that attitudes are being learned continuously although usually in an accidental or incidental fashion rather than according to a plan.

Where differences in learning appear to be evident the nature of the material being learned and of the learner himself should be examined. The rapid or delayed acquisition of certain specific behavioral patterns may be characteristic of the nervous system in a given individual. In most discussions of education the notion of individual differences is prominently displayed, but in the classroom practices at the higher levels of education it is largely ignored. It is no longer possible to accept a description of the nervous system as a simple, passive, quiescent organ not unlike a telephone exchange or conduction system waiting to be called upon to function. The associationists' concept of stimulus-response can no longer be held without question. Although few significant experiments in the learning area have yet been carried out, the neurophysiologists' view of the nervous system as an always active instrument prepared to respond to a stimulus, but with each stimulus forced to compete with others in this already active instrument, is more in keeping with the available data.

3. *Motivation.*—Every learning psycholo-

gist regards motivation as crucial in learning, but there is very little agreement upon what it is. It is generally accepted that motivation involves energizing of behavior. But to go beyond that, to suggest that the motive or drive sets the organism into action, forces it to move, to try, to err, eventually to achieve, is to oversimplify, for this implies that without the drive there will be no action. There is no evidence to indicate how drives develop, and there are no units with which to measure them directly. There is not even any simple definition of motivation. Physiologically, it can be described as a disturbance in the normal rhythm of the brain, but all this says is that motivation is not an entity, a thing. In essence motivation refers to a wide variety of conditions that alter the stimulus-response pattern. We really know little more about it than that.

Empirically, however, certain things can be said about motivation. Although the precise mechanism is not understood, it is clear that the most rapid and most efficient learning seems to occur in the presence of a challenge, some kind of obstruction or obstacle, which is *felt by the learner*. Usually the learner tries several different ways to overcome the obstacle until it is finally dealt with by one means or another. If the obstacle is too great he may ultimately withdraw or design some escape. If the goal is too remote the effectiveness of the challenge is lessened. This is particularly important in medical education, since it is generally assumed that the student is well motivated to become a good physician because he has come to medical school. A very mature student may be stimulated by this challenge even though the goal is 4 years away; but a less mature student may require more immediate challenges that he can meet, achieve, and then move on to other things. The immediate challenges will be most effective if they relate directly to the more distant goal. This is illustrated by the experience of the mid-1940's when many discharged soldiers returned from the wars to enter medical schools. The high level of their maturity and the steadfastness of their purpose were commonly noted, along with their ability to move rapidly and efficiently through the educational program in medicine. Now the GI's are gone. The younger, less mature student is with us again, and faculties deplore his casual way, his lack of drive. In part this may relate to his inability to use the very distant goal as a motivating force in his learning.

Interest is another essential item in motivation, but it is well for the teacher to remember that the only interest he can count on is the already active self-interest which the student brings to surmounting whatever problems are present. The teacher can be most useful if he can help the student to identify these interests and to solve the problems. This requires that the teacher be interested in students and have some knowledge of them as groups and as individuals. But he cannot help students to capitalize on their interests if he does not have their attention. Attention is the spearhead of learning, and the art of teaching is in part the art of controlling and directing attention. It is for this reason that novelty of experience is important. The observation of a surgical operation by the first-year student may appear to pay few dividends in terms of information gained, but it may be an enormously profitable means of capturing attention. When students are not learning, more of the same thing will not help. The teacher must re-design the learning activity to capture attention and proceed from there. Once the student's motives and interests are found he may be helped to develop new interests, and most quickly if they are related to an active interest he already holds. The teacher does not create the interests or the motivations; he helps the students to find them.

Motivation is also affected by the student's self-ideal and self-concept: what he wishes he were and what he thinks he is. Thus the morale of the teaching-learning environment becomes important in the learning experience. It is here particularly that the teacher must be interested in and aware of individual differences.

In essence this says that there is no

single motivation that can be ascribed to all students, or even to all medical students, or any single set of educational procedures that will be equally effective for all. Teachers try to stimulate students to react through various kinds of incentives. The intrinsic incentives are the rewards which students gain from achieving goals, satisfying their own needs and desires. The extrinsic incentives are the medals, the grades, the place on the honor roll, the graduation cum laude, which are basically outside the learning situation, for there is no relationship between these and the task at hand.

It should finally be noted that the motives of teachers will also have an enormous influence upon the learning environment.

4. *Emotion in learning.*—Very little, if any, learning takes place without emotion. Mild emotion actually facilitates learning, but mild emotion is not synonymous with pleasant emotion alone. Mild degrees of tension, for example, may make learning both more rapid and more efficient. It is the violent emotions which are disruptive. Physiologically these prepare the organism for fight or flight, not for learning. The strong emotions of anger or fear exhaust and interfere with learning. The teacher who encourages such emotions or uses the students as an outlet for his own strong emotion impedes the process he is committed to facilitate. It is his professional task to control his own emotions and to direct the learning situation in such a way that violent emotion is not aroused in the student.

5. *The physical setting.*—There is no evidence to suggest that learning is accomplished more readily in one setting than another. Despite the absence of laboratory data on this matter empiricism and practical observation allow certain conclusions to be drawn. For example, learning from a lecture cannot take place unless the lecturer can be heard; a student cannot develop skill in the performance of a physical examination unless he has someone to examine. Obvious as these matters may seem, their neglect is too frequent to allow them to be passed by without mention.

6. *Roles of the teacher.*—The teacher in his time plays many parts. In the performance of his task he serves the needs of society and of the student as well as his own needs. From time to time these roles may be in conflict. When they are, the conflict disrupts the teaching-learning situation. The most disruptive is that role of which the teacher may be least aware: that in which he serves his own needs. The position of the teacher makes it particularly easy for him to satisfy these needs, and almost invariably this takes place at the expense of the student. In the selection of material he often leans unconsciously toward the things which are of greatest interest to him, rather than the things which might be of greatest usefulness to the student. The drive which many individuals feel to dominate others is particularly easy to satisfy when one is in control of a group of students. Instead of encouraging them to exercise their own thinking, to become independent and critical, the instructor may demand that students accept his ways, his thoughts, his conclusions. It is impossible for any teacher to escape his own needs, but it is not too much to expect that he will be aware of them and to place them in a position that is distinctly secondary to the needs of the students. Teaching is a professional task, and the professional in any field goes beyond himself in the fulfillment of his obligations to others. This does not say that he must do things which are distinctly uncomfortable for him, for this will inevitably be perceived by his students and lead to anxieties and tensions which will hinder learning. It suggests that, since his major role is to help students to learn, the instructor must find the most comfortable role for himself which will best serve his students.

The basic responsibilities of the teacher are those of gaining the students' attention and reinforcing learning by arranging the circumstances, the conditions, and the materials of instruction in such a way that challenges, perceived by students, are generated and responses encouraged. The learning psychologist would further add that whether you tell, whether you guide, or

whether you demonstrate to the student depends primarily upon whether this stimulates him to learn. If it does the technique is worth while and should be used. If it does not, it should be abandoned.

7. *Specific operations.*—Should the teacher space learning, or "lump" it? Should he teach by parts or wholes? Should he emphasize speed or accuracy? Learning psychologists in general can say only that it depends on the nature of the learner, the material to be learned, and the conditions of learning. For some situations one thing will be most appropriate, for others a quite different operation will be best. Empirically, there are certain guide-lines. For example, in the parts-wholes question it is obvious that there is a limit to the amount of material which can be comprehended by some learners. In general, the findings in the classroom, like those in the laboratory, suggest that it depends upon the individual, what he is learning, and what are the circumstances—all of which means that there must be opportunity for the use of a variety of materials and methods, that no one piece of instructional material, no one method, no one kind of examination is best for all.

In the face of this uncertainty, what characterizes the successful instructor? In general, the effective teacher has learned how to share himself with his students and his fellow workers. In the most practical terms Professor B represents an empirical construct of the good teacher, based upon the limited laboratory evidence that is available, and the hypotheses that still need further testing. Professor B is not, and cannot become, completely permissive, for he shares a responsibility for the development of learning activities. However, he has learned to relinquish the monopoly on the teaching-learning situation which too many teachers feel they have won. By relinquishing this monopoly his students will come more quickly to learn that the ultimate responsibility for learning is theirs.

STUDENT AND TEACHER

The human product of a medical school is fashioned from raw material selected with care and exposed to an environment created by and reflecting the values of a faculty. It is neither the material nor the environment alone which determines the outcome, but the interaction between these ingredients. The purpose of this presentation is to sketch in broad strokes the nature of the student, the nature of the environment, and to examine their implications for learning.

Each medical school is annually faced by the problem of student selection, and it is the rare faculty which is completely satisfied by the work of its Admissions Committee. This committee is faced with an almost impossible task when it is asked to identify from a mass of applicants the potentially good medical student when the ideal has never been spelled out. It must operate on the basis of certain assumptions the validity of which has never been tested. On one point, however, there is general agreement: the good student is the one who is intellectually able to complete the course of study.

Such a characteristic is not difficult to identify. Empirically, it has been shown repeatedly that the best single predictor of success in medical school, when success is defined in terms of academic achievement, is the grade point average in college. Unfortunately there are pitfalls in even this measure of intellectual attainment. Grades from college to college are not comparable, and even within a single school may vary from department to department. Admissions committees are alert to these discrepancies but have no data which will allow a quantitative comparison of scores. They must rely instead upon experience which is seldom documented in any way that would withstand careful scrutiny.

An attempt to avoid this subjective interpretation of academic accomplishment is envisioned by the Medical College Admissions Test. This standardized device, which

includes sub-tests of verbal ability, quantitative ability, knowledge of science and of modern society, has in some medical schools rivaled the undergraduate grade point average as a predictor of successful completion of the course of study. In other institutions the correlation is so low that test results are not seriously considered in the selection process. It should be pointed out, however, that the students against whom this test has been validated have already been selected for medical school admission on the basis of intellectual achievement, which introduces a considerable restriction in range. If all those excluded because of low intellectual ability were also allowed to enter and their accomplishments included in the statistical tabulation, the MCAT would unquestionably exhibit a considerably higher correlation with academic achievement than is presently true.

Despite such limitations, these methods alone are remarkably successful in identifying the students who are bright enough to graduate from a school of medicine. However, he who is bright enough to graduate from one school may not be bright enough to graduate from another. The lowest MCAT score at one medical school in the United States is ordinarily higher than the highest score at another. The student rejected from the first might perform in a superior fashion at the second. The responsibility of premedical advisors in guiding applicants to medical schools in which the intellectual range of the student body is in keeping with that of the individual applicant is obvious. If the applicant gets into the wrong stream he may be lost to medicine or, if admitted, frustrated by the intellectual setting in which he finds himself. It is equally important for the faculty of a medical school to know the general intellectual level of the student body with which they are dealing. Otherwise they may pitch their instruction to a key which is entirely out of keeping with the abilities of their students. When students fail to meet an instructional challenge teachers commonly react with rage or frustration, when understanding may be the quality most needed to facilitiate learning.

The consistency with which these measures of intellectual accomplishment have identified students who can successfully complete the course of study has led selection committees to depend upon such data often to the exclusion of other qualities which may be desirable in the medical graduate. It is understandable, then, that students, whose goal is admission to medical school, will direct their efforts chiefly toward academic achievement. Thus, long before a student comes under the direct influence of a medical faculty that faculty has shaped his life and indicated what it values most highly. The medical school catalog, which exhorts the student to gain breadth of vision and a wide understanding of human problems before entering a school of medicine, can never compete with the practice of selection made chiefly on the criterion of academic achievement.

Selection on this basis is made with the utmost sincerity and belief. If the man with high college grades has the greatest chance of success in medical school and success in medical school could be equated with success as a physician, there would be no reason to question its propriety. Unfortunately, there are few data to confirm (or deny) this assumption. Studies of other professions have failed to reveal any correlation between academic achievement and success in the profession (8). The single study designed to develop such data in the field of medicine led to the same conclusion (6). Until these conclusions are confirmed or denied we can only continue in a state of uneasy ignorance.

In theory, at least, there are non-intellectual characteristics that may be important to identify in the potential medical student. George Packer Berry has said, "To succeed in horse racing you need a horse who not only can but *will* run fast." What characteristics are most important in helping the student who is intellectually able to complete the course?

One of the most vital appears to be motivation. Motivation, in one sense, refers simply to the assiduousness with which the student will apply himself to the course

of study, how much he will drive himself to work. A second kind of motivation, perhaps related to the first but not identical with it, relates to the factors which led him to select a medical career. When the student is questioned on this point by a selection committee he realizes that values are involved. The profession of medicine appears to place a high value upon a service orientation, and the candidate who does not fit this pattern may find his chances for admission to apprenticeship status lessened. At the same time, our contemporary society is oriented toward achievement (accumulation of money, of things, of status) rather than service (giving of self), and if the student is representative of the society in which he lives this will probably be his orientation. Shall he, then, reflect society and lessen his chance of admission, or shall he respond in the way which appears to be expected? Shall the medical school select chiefly those who are not good representatives of the society of our time, or those who are able to mouth the appropriate response without believing it? Or shall they take a representative sample and attempt to change its orientation through an educational program? This dilemma of motivation the medical profession, through the selection committees of its professional schools, must face realistically.

Another non-intellectual characteristic of considerable interest to a selection committee would be covered by the broad term of "mental health" or "adjustment." The device most widely used to appraise this quality of the medical applicant is the personal interview. The type of interview may vary from school to school, but there are few in the United States which do not use this technique in one form or another, despite a considerable body of data which leads to the conclusion that the interview has a very limited usefulness. This limitation usually stems from a lack of criteria for the observations made during such an encounter. The absence of specific data regarding the non-intellectual characteristics which describe the successful student, physician, or investigator makes it very difficult to identify these characteristics through an interview. Since criteria are not available, the interviewer usually bases his conclusions upon impressions which may relate as much to the candidates carriage, speech, or physiognomy as to his motivation for medicine, integrity, or adaptability. Interviewers have a tendency to rate highly those people who are most like themselves, or give evidence of favoring a way of life which is not unlike their own. This may be a satisfactory method of rating if the interviewer has himself lived comfortably and successfully in a given medical school for a period of years; but it can scarcely be said to possess a high degree of validity or to be a reliable index of a candidate's ability to make a successful adaptation to another medical environment the personality and value system of which may be entirely different.

In an effort to introduce greater precision into the appraisal of these characteristics, which are admittedly described in a rough qualitative way by the interview, a variety of psychological testing devices have been used. Although none has yet been demonstrated to have greater reliability as a selection device than academic achievement or the interview, they have provided a description of student group and school personality patterns that are arresting. An example of such a device is the Strong Vocational Interest Inventory by which interest patterns of a number of professions and occupations have been described. As might be expected, the successful medical student shows a pattern which is congruent with that of the successful physician. (It does not indicate, however, that he will become a successful physician.) More interesting are the secondary patterns that may be revealed by this test. A majority of medical students in one study exhibited a secondary pattern that resembled that of production managers, big business men, manufacturers, engineers. They also achieved high scores on the Aviator scale of the Strong Inventory. Further study suggested that the only thing pilot and medical student groups had in

common was that they were predominantly male and had no particular cultural interests (3). It seems significant that the medical student pattern should resemble these occupations rather than the minister or social worker whose orientation toward service seems closer to the ideal of the physician generally held.

Making use of similar testing devices, a research study of the Association of American Medical Colleges is designed to describe the pattern of interests and values in a large sample of American medical schools. Through continuing study of student bodies in these schools it may in time be possible to develop data which support the present impression that a student of high intellectual ability may do poorly because his pattern of interests and values is at sharp variance with the predominant pattern of his school. The student who deviates too sharply from this pattern may manage to succeed with the agony that accompanies bucking a system, or by modifying his own personality pattern; but many who are unable to manage one of these adaptations fail even though their intellectual qualifications should allow them to succeed. Enough work in this area has been carried out in the colleges to give such an assumption the solidity of hypothesis. Farnsworth, Funkenstein, and Wedge (2), for example, studied the group of colleges participating in a program of early admission of intellectually able high school students. They were able to classify the schools into two major groups: (*a*) The "pragmatic" school was characterized by an orientation toward preparing their students for entering the world, doing its work, and achieving concrete goals. (*b*) The "ideistic" school was more concerned with self-understanding and the world of ideas. The students in this group who failed academically were almost uniformly those who had been admitted to a school with whose pattern they were out of phase. A corollary study involved the transfer of one of the most successful and popular teachers from an "ideistic" school to the faculty of a "pragmatic" school, where he was notably unsuccessful. It is true that some students who were out of phase with the school to which they were admitted did not fail. It is also true that the transferred professor did not fail in his encounter with all students at the school where he was out of phase. However, it was more difficult for each to achieve the same measure of success. If education is designed to help students to learn, then it would be most desirable to provide them with an environment in which learning can take place most readily.

From the appraisal of intellectual and non-intellectual characteristics of applicants to medical schools it is possible to make a few generalizations. With reasonable accuracy one may predict whether his intellectual ability will allow the applicant to graduate. To some degree it may be possible to predict whether his non-intellectual characteristics will make it more difficult for him to pass successfully through the course of study in a given school. But there is not yet available any accurate predictor of his successful performance as a physician.

Let us turn now from the selection of students and the prediction of their successful completion of medical school to the interaction between the student and his environment. Like the legendary medical school, the real one appears to an observer and to a majority of students to be filled with stresses, some of which are obvious while others are revealed only by probing. The most universal is that which attends examinations, for in most American medical schools these are the determinants of a student's career. It is true that the kind of response a student makes to examinations will depend in part upon his basic personality structure and past experience with test devices. However, among medical students there is a distinct impression that examinations are often designed to be extremely difficult not so much because the faculty wants to help students to learn or to determine how much they have learned as to subject them to a kind of initiation rite. Whether the examination is really designed

as a threat, to eliminate students rather than to appraise their progress, the perception of such a threat is as devastating as the threat itself; and one cannot seriously question the occasional accuracy of this perception. There are a significant number of medical teachers who believe sincerely that if a student is to enter a profession in which errors may lead to the loss of human life it is necessary to prepare him to withstand stress of all kinds, and to work in the face of unreasonable demands, uncertainty, and great pressures. If a man is unable to conduct his life successfully in the face of these stresses it is better to discover and eliminate him before he joins the profession rather than after he has contributed to some human tragedy. The question which is seldom asked is whether these kinds of pressures in a medical school are comparable to those which the physician must face. The available evidence would certainly not support such a conclusion. The perception of stress and the response are exquisitely individual matters. Under enough pressure any man will buckle, but what represents severe pressure for one may be accepted with equanimity by another. The graduate of a medical school is free to choose his way of life, and he will in all likelihood select that form of professional activity in which he is comfortable, in which he is most free of anxiety, and in which he can function most effectively. The medical student has no such choice, and his response to the stresses which may be imposed by a faculty will depend upon how they impinge upon his individual personality, and bear no discernible relationship to the way he might function as an independent practitioner or investigator. Medical teachers would do well to remember this difference when they are inclined toward the purposeful creation of stressful situations. Otherwise their interpretation of the student response may be quite faulty.

There are many things less obvious than examinations which can be identified as stresses for more than a small fragment of a student body. The identification of such situations does not necessarily suggest that they can or should be eliminated from the medical school environment, but a faculty should be aware of them and familiar with the responses that they may generate. Every physician recalls the first day in the Anatomy laboratory, the flippant remarks to cover uneasiness, the search for an acceptable excuse to escape for a moment, the one or two students who fell in a faint. Less obvious but often more traumatic in the student's life is his first experience in the role of physician with body exposure and the performance of a complete physical examination. Often coupled with this is his uneasiness about invading the privacy of another adult by asking intimate questions or performing technical procedures when his professional competence and responsibility are extremely limited. He may be deeply troubled by his introduction to psychiatry with its attendant illumination of his own emotional problems and conflicts. The sociologists have pointed out that a major stress is the adaptation to a physician's role of uncertainty. By and large the laity regard the physician as omnipotent in the field of health. The beginning medical student is no exception to this and may be in an even more vulnerable position, since he is aspiring to this role. It is with great difficulty that some students learn to accept the reality that physicians do not cure everything, that there are no universal truths in medicine, that they may make patients worse as well as better, that they may even commit fatal errors. Such anxiety may be compounded by the very limited opportunity to resolve these problems through ventilation and discussion with members of the faculty. Students are often deeply troubled by the apparent expectations of the teacher who is a specialist in his field and seems to expect the student to perform as a specialist rather than as a novice who is being asked to accumulate information and skills in many special areas of medicine simultaneously. Having passed through an educational program in which dependence is emphasized, the student approaching the

end of his medical school career may experience panic at the prospect of independent action which will shortly be expected of him. For those students who are service-oriented, the common orientation of a full-time faculty toward research may represent a stress of considerable magnitude. There also are always the problems of family and finance which are becoming more pressing as an increasing number of medical students marry and have children. Nor can the battle fatigue of year's end be overlooked as a significant stress.

Some medical teachers would regard these as inevitable parts of a medical education which the student must face alone. It would be wrong to deny the individual nature of the problems, but they should concern a faculty, because the major cause of student failure is not intellectual inadequacy but the interference with learning that results from stress. It is the responsibility of the faculty to help students learn, and this implies that they will be familiar with those things that may interfere with learning, the academic manifestations of these problems, and the methods which might be used to remedy such situations whenever possible. A part of the remedy lies in an awareness of personality types and their response to different environments.

According to one classification of personality types the extremes of the spectrum are labeled extrapunitive and intrapunitive. The extrapunitive tends to blame other people for the things that happen to him and the intrapunitive to blame himself. In any random sample of the population a majority would fall in some middle zone with shadings toward the extremes. In a normal student population the two-thirds falling within this middle zone will do equally well, when academic achievement is measured by standard test devices, whether they have been exposed to an educational setting that is predominantly of the didactic lecture type or of the seminar discussion type. At the one end of the continuum, however, is a group of students who will do very well in the more formal guided setting and very poorly in the informal, independent environment. Conversely, at the other end will be found a group who respond in an opposite manner (10). Some students have a great need to express themselves, to be given freedom to search out their own information, to challenge and to be challenged. Others are very uneasy in such a situation and, despite intellectual ability equal to that of their colleagues, will do very poorly when asked to perform in this way. In medical schools the first two years usually provide a rigid, structured and carefully guided program, while the clinical years more commonly emphasize freedom of intellectual inquiry and encouragement of independence. Medical students at one end of the spectrum may do poorly in the early years and brilliantly in the later years, while their counterparts suffer an opposite fate. This is not a matter of intellectual ability but of basic personality pattern. The teacher who fails to identify the cause will scarcely be in a position to help the student and may in fact do him a great disservice.

Another categorization of personality starts from a purely hypothetical standard called "normal." From this point there are extensions in directions arbitrarily labeled passive, aggressive, and withdrawn. The end-point of each continuum represents pathologic or psychotic behavior; but a normal individual may move back and forth along any of these pathways according to the situation in which he finds himself. Each of the pathways and orientations toward life is acceptable and productive as long as the oscillation does not go beyond the bounds of normality. Under stress the movement of any individual will be in the direction of illness. Under more favorable conditions movement will be in the direction of health. In an educational program the stresses should be sufficiently small that the student can work within the optimum range of emotional health rather than being pushed toward illness, where the efficiency of his learning will be markedly reduced. It is helpful for a teacher to recognize the fact of these oscillations if he is to under-

stand student behavior. The student who reacts with anger may not be angry at the instructor, the one who is withdrawn may not be withdrawing from the teacher. Each may be exhibiting his individual pattern of reaction to a situation of stress. Under these circumstances the responsibility of the teacher is to identify the stress and modify it in such a way that learning can once more take place efficiently. If he responds emotionally to such student behavior, or does no more than make a judgement of the student, he fails in his professional responsibility as a teacher.

Most students, of course, are in the large central group and will pass successfully through the medical school experience whether faculty members worry about their personality structure or not; but at each end of the distribution curve are a few who may fail unless there is modification of those stressful situations which may push them too far in the direction of pathology for much learning to occur. Once these students complete medical school they will find their own niche, and since they are intellectually capable individuals they can be expected to be as productive and successful as their peers.

When students get into academic difficulties, which have their basis in personality problems, to whom can they turn for help? It is probably fair to say that advice may be given by anyone from whom the student seeks it, but counseling requires special preparation and orientation. Advice is something you give to a student. Counseling is something you do with him. There are very few faculty members who are prepared to carry out the latter task. A member of the administration may accept this responsibility, but it is interesting to note from the data accumulated for the Fifth Teaching Institute of the Association of American Medical Colleges that the student would only rarely select such an administrative officer as a counselor. The psychiatrist is professionally prepared for the task, but if he is an agent of the administration his therapeutic relationship with the student is almost certainly compromised. There is also an atmosphere within many medical schools which discourages the student from seeking help, for if his search is detected he is identified as a weak sister who cannot get along rather than as a courageous man who seeks help when he needs it. It is perhaps for this reason that a medical student seems far more likely to seek help from someone outside the medical school; and this suggests a fundamental weakness in the dominant relationship between a faculty and the student body. If trust and mutual confidence have not been established how can learning be expected to proceed with maximal effectiveness?

Most of this discussion appears to have focused upon that small number of students in each medical school class who encounter serious difficulties. The principles which have been presented apply equally to all students, if the premise is accepted that more learning will take place if stress and anxiety are not excessive. It might be well before pushing this premise further to define anxiety as that vague, ill-defined fear which is not focused upon a goal. In a psychiatric sense anxiety is never an advantageous emotion; a student's honest concern over an examination because he is dealing with a difficult subject is quite different from his worry about an examination because he believes the teacher is out to get him. The student may believe the teacher is out to get him because the student is psychotic, or he may think the teacher is out to get him because the teacher *is* out to get him. There are undeniably teachers who take this as a goal. They may put such pressure on all students, or on just a few students, or on just the "smart alecks," or only on students who remind them of their fathers. There are teachers who do this consciously in the belief that apprehension and anxiety will improve learning. The data derived from study of all but the most simple kinds of animal and human behavior deny the validity of this belief. The threat of failure, the threat of being made to appear a fool do not enhance learning. With fear as a mo-

tivating force it is possible to make some people learn some things. Children may be indoctrinated into toilet training at an inappropriate age, but it is this kind of training that later breaks down or leads to unforeseen and undesirable side-effects. Whenever a student feels anxious in this sense of the word, the anxiety interferes with learning, and he will go through all sorts of maneuvers to escape the situation. He will do what he is told, he will adapt or conform, he may even accumulate a good deal of information if this is the only way to escape. But he will not learn. Neither is he likely to learn if he feels no tension at all.

If it is the responsibility of the teacher to facilitate learning, it is his task to keep tension within an optimal level for all students, not simply for those students at the extremes who will otherwise encounter academic failure. It is only by such understanding and effort that he will be able to improve the quality and the efficiency of student achievement.

Are there practical modifications of subject matter, of materials and methods of instruction, of evaluating devices, of the total school environment which can lead the student to more productive and rewarding activity? Individual differences have been emphasized so regularly that the belief must by now be apparent that the ideal program would be individually designed and implemented for each student. The impracticality of such an ideal does not mean that movement in this direction cannot be achieved within the limits of time, manpower, and money presently available. Instead of a striving for perfection a few simple and direct steps can be taken. One of the simplest is for the teacher to act as though the student were an individual by using one of the most fundamental social graces, calling him by name. The infrequency with which clinical teachers know the names of their students is appalling. Through service after service the student may pass essentially as a cipher, pitifully grateful for any crumb of recognition as an individual. At the same time he has an ambivalent passion for anonymity, a desire not to be identified, for it is only through identification that his progress toward the goal of graduation can be blocked. It is unfortunately true that students do not always perceive their teachers as sincerely interested in helping them toward this goal. Instead they are inclined to think of them as judges, and it is the air of judgement which may defeat the teacher-student relationship; for if the teacher is a judge how can students feel free to expose their ignorance by asking questions, or responding to his questions if that response may be used in judgement rather than as a means of helping them to learn. It is a lack of trust which may impede them and their learning. Until the instructor by his behavior exhibits an interest in students as individuals it is unlikely that trust will develop. When students are asked by someone in no way responsible for their progress through a medical school what characterizes the best and the worst instructors they have encountered, a common trend runs through the comments. The best teacher is usually described as one who is available, friendly, willing to spend time with students, who gives evidence of a personal interest in students, admits his own ignorance where ignorance exists, and combines practical with theoretical concepts in his teaching. The worst teacher is usually described as one who knows no less than the good teacher but who seems disinterested in students, who gives facetious answers to their questions or makes them feel like fools for asking, who just doesn't seem to care about teaching.

In part these characteristics relate to the basic personality structure of the teacher, for he too is an individual and may have his problems, feel stresses, react to anxiety even as students do. In fact, one of the stresses which troubles him may be that he must face students who will inevitably have a greater body of information than he in some field. If he is sufficiently secure as an individual to accept his own limita-

tions, if he can tolerate differences of opinion, the questioning of his judgments and skills, then he can take an interest in students and encourage their learning rather than having to prove to them that he is a competent person. If he does not have this personal security, if he is afraid that a student will ask a question he cannot answer, if he is concerned that a student may quote the latest journal article in his field before he has had an opportunity to read it, then he will be unable to create a relaxed environment for learning, since he must devote most of his attention to keeping the students off balance lest they challenge him. It requires a confident man to admit his own ignorance, but this is a professional responsibility of the teacher, as well as simple honesty. He may never learn that he will not lose face by such an admission, but he must know that whether or not he admits it the students soon recognize who is sham and who is real.

Since intellectual honesty is one of the qualities we prize most highly in the physician we must constantly guard against the small intellectual dishonesties that can creep into our educational programs. For unless faculties set the example, how can students be expected to follow it? A simple illustration may bring home the point. We are in the midst of a great surge of interest in the patient as a whole, and entire curricula in medicine have been built around the idea that disease cannot be considered apart from the individual in whom it develops, the social and economic environment in which he resides, and the emotional forces which impinge upon him. Yet when students are asked how many of their instructors appear to deal with the whole patient in the course of their teaching the response suggests that the number is disheartenингly small. This does not mean that the physician must delve into the social, economic, and environmental history in the course of every patient visit with a group of students. It does mean that the patient should be treated as an individual with a name, interests, hopes, and fears and not as an inanimate lump of wood with no feelings, no perceptions, no identity, except a tumefaction or a heart murmur.

We must be honest with students if we want them to be honest. To do so we must share with them the real purposes of the experiences provided as a part of their educational program. Without an understanding of the purpose the worth of the experience is lost, and if there is dishonesty in the purpose it leads to disillusionment as well as to the learning of bad habits. If the student is told that his initial history and physical examination are important to the patient and to the service he will find it hard to believe if no one ever reads his work-up. He will continue to do it, but he will regard it as going through the motions rather than the real thing. The repetitious performance of routine blood counts and urinalyses may become a meaningless routine if the faculty says that it is important to patient care but if the students quickly learn that no one pays much attention to their contribution. On the other hand, an honest faculty admission that these tasks may seem burdensome and no more than drill but that, as a faculty, they believe that such drill is important, the response of students may be far different. They may not enjoy the task any more, but they will respect the honesty with which its purpose has been defined.

When the student, like all other humans, fails from time to time to fulfill a responsibility it is the teacher's role to perceive that failure and to help the student learn from it. Not by beating him, not by dismissing him, not by punitive acts, but through the more constructive measure of understanding counsel and guidance which is not synonymous with overlooking or excusing the failure. There are many who insist that a student will learn only if his superiors drive him to learning. Whole services are set up with this philosophic orientation. The evidence indicates that this may succeed in producing conformance, but at an exorbitant price in negative learning.

If the teacher is intellectually honest, if he admits his own errors and shortcomings, there is considerably less pressure upon the student to conceal his own ignorance. When a student commits some major act of intellectual dishonesty, such as the performance of a "sink test," the teacher cannot react with righteous indignation alone and dismiss the student from his service. The act is a symptom. It may be a symptom of the student's ill health, but alternative possibilities should also be investigated. Did he do this because he was lazy, because he was afraid that if he did not come up with the right answer he would be chastised or that he might come up with a result he could not interpret? What, in essence, is the precipitating cause for such behavior? It may be necessary to take some disciplinary action with such a student, but such a step should not be taken without at the same time investigating the environment to determine whether the act reflects something unhealthy in the educational program.

All these suggestions concern attitudes. The environment takes on meaning not through its physical features, the number of people who populate it, or its content, but through the attitudes which suffuse it. Faculties in the past have neglected this area in their dedication to the factual material of their educational programs. Without modifying the curricular structure or the content, without altering the nature of the raw material it is possible to introduce profound changes into the experience provided for medical students by even the simple devices noted here. The student body is a collection of individuals, not a homogeneous mass. Unless this individuality remains prominent in the faculty mind a helpful modification of the environment is all but impossible.

THE TOOLS OF INSTRUCTION

There is an outraged cry in mid-twentieth century America that the educationist, who is said to have captured control of the educational system of the country, is concerned exclusively with the materials and methods of instruction at the expense of the content of the program. Some educators must plead guilty to such a charge. Some physicians would also be found guilty of treating a distortion of the electrocardiogram rather than the patient who generates this electrical impulse. Neither is defensible.

The professional educator *is* interested in the tools of instruction, even as the physician is interested in the electrocardiogram; but he regards these tools as no more than devices which contribute to the efficient achievement of the goals of an educational experience. One of these objectives is certainly to help the student acquire a body of information which has been selected on the basis of the institutional goals, not on the basis of the instructor's academic hobby or the departmental bias. However, the acquisition of information is not the sole objective of education. Others include the development of understanding of the information and the accumulation of skills and attitudes. It is these objectives which dictate the materials and methods of instruction, not the converse. For example, a lecture may be useful to convey information; a laboratory exercise or small group discussion may encourage students to grapple with a problem in order to gain understanding; drill may be provided to allow them to acquire skills; *but whatever the method, it is selected on the basis of subject matter which has been chosen in the light of objectives.* In the same way instructional materials, the blackboard, slides, films, books, and patients, are chosen not because they have unique and independent virtue but because their use will facilitate the achievement of specific goals.

The purpose of these introductory remarks is to indicate quite simply the basic truth that materials and methods of instruction are inseparable from the subject matter and the objectives of the program. Disregard of this interdependence by any teacher will

lessen the worth of the educational experience for all students.

A discussion of objectives, which represent the base from which a program grows, is inclined to be sterile, for it so frequently results in a collection of handsome abstractions which can be endorsed, placed in a catalog, and forgotten. The most fruitful discussion usually emerges from the search for a solution to a specific problem such as the number of hours a course should occupy in the total curriculum. If such a question is not to be decided upon such irrelevant factors as the irascibility of the departmental chairman or the established tradition, it is essential to spell out the institutional goals and the contribution such a course can make to their realization. Since these objectives do not spring full-grown from the head of a dean or a committee, it is important also to identify their ultimate source. In public education objectives develop out of the basic philosophy of democracy (which implies that an educational program in America will necessarily be different from that in Soviet Russia), from the basic needs of students (which include the need for achievement, for self-respect, for belonging, for freedom from fear), and from the characteristics of contemporary society (which would lead to the introduction of driver training rather than horse currying). One might suggest that the over-all objectives of medical education emerge from the philosophy of scientific thinking, from the health needs of the community, and from the definition of the "good" physician by the profession. If the sources have been correctly identified then it is from these reference points, and not from the needs of any academic discipline which operates within the framework of the school, that the program of medical education must grow. It is not the role of the educator in a public school to determine the objectives but to cause the community to reach this decision. In the same way it is not the exclusive responsibility of the medical educator to determine the objectives of medical education. He must be both sensitive and responsive to the needs of society and of the profession in arriving at a definition of goals which is never final. The needs of society and of the profession change, and to these changes the educational objectives must respond if the school is to remain a vital force in the community which supports it.

The development of sound objectives requires that judgments be made. However, these judgments should be undertaken in the light of criteria, among which might be included the following: (*a*) Is the objective real, and is it understandable? An objective is real only when a faculty attempts to do something about it. They may say with the greatest sincerity that they want to help students develop high ethical and moral standards; but if the educational program is built entirely upon the acquisition of information and skills this objective is not a real one. An objective is understandable only if there is common agreement as to its meaning. Is there agreement upon what constitutes the "good physician" which our schools are committed to produce?

b) Is the objective defined in terms of behavior of the learner? Faculty statements of objectives commonly begin: "to teach. . . ." This may be a commendable desire, but the phrasing suggests that because the teacher has taught the student has learned. Under these circumstances the program is likely to be appraised in terms of effort devoted to teaching rather than learning.

c) Is the objective based on the educational needs of the learner? At this point arises the touchy question of who determines these needs. Unquestionably the faculty is involved in this, but is it their responsibility alone? A faculty may agree that the "good physician" must master a given body of subject matter which the faculty will then define, organize, and present. From another point of view, they might agree that if the student is to become the "good physician" the faculty should present him with a set of experiences which enable the student to define for himself what is required; on the one hand the faculty has determined

the educational needs of the learner; on the other they have provided the student with an opportunity to identify, with faculty help, his own educational needs. This point of curriculum theory may lead to controversy, but there are occasions when faculty members *must* relinquish to students the determination of educational needs. This is demonstrated when the student is asked, "Where do you feel weakness that we can bolster during the next week, or month, or year of your educational program?" No teacher can answer the question; and if the educational offering is to be most productive the teacher must be sincerely interested in the response which the student alone can supply.

d) Is the objective achievable? A qualification might be introduced by adding ". . . within the time available and with the facilities at hand." It is probable that a fourth-year medical student might with sufficient time master a body of knowledge comparable to that of the ophthalmologist who teaches him. But if he is expected to do this while a major share of his time must be devoted to other disciplines, the goal is not achievable. This sort of expectation is not uncommon in medical schools, particularly in the more restricted specialty areas where faculty enthusiasm for subject matter runs high and time allotment runs low.

e) Is the objective measurable? In the area of information, tools of measurement are reasonably precise. But precision decreases steadily as one passes through skills and understandings to attitudes. Yet even the latter are susceptible to some gross measurement, and even this is better than no measure at all, for if no measurement is made, there is an inclination for a faculty to assume that the goal is being achieved. Nothing could be more dangerous to an educational program, since it leads to complacency without foundation. It might be better to omit an objective whose achievement is not tested by some means, for otherwise it does not fulfill the criterion of reality.

The purpose of this lengthy consideration of objectives is to emphasize the obvious but often neglected truth that only with goals in mind can the materials and methods of instruction be wisely selected. It should further emphasize the hazard which attends individual or departmental disregard of the over-all objectives of the institution. The instructor who conducts several seminars or lectures or laboratories may have his objectives very well in mind and fulfill them admirably; but who sees to it that all the activities of the program serve the broad goals and that each of these goals is being somewhere served during the 4 years of medical school? This, too, is a faculty responsibility.

Definition of objectives is only one of several factors which influence the selection of an instructional tool. The amount of time and the number of students will also guide the choice. A cry heard throughout the land protests against too little time and too many students. The cry cannot be ignored, since it is often reality speaking. However, numbers and time alone should not be used by the instructor as an excuse for avoiding something he did not want to do in the first place. Eighty students for 1 hour does not necessarily compel the use of a lecture. It is possible to involve even this many in group discussion, yet it would be pointless to do so unless such a method would be advantageous in helping the students toward the specific goals of the experience; nor does the presence of a single student rule out a lecture which may be the best method for conveying information that is appropriate for that student at that time. Time and numbers will guide, but they will seldom dictate the choice of material or method.

Student ability should influence the selection of the instructional tools, but small attention is given to this factor in most institutions of higher learning. For example, the reading level of entering medical students is extremely variable. Although no indisputable evidence has yet been advanced there is at least an impression that medical school text books, and particularly those

of the basic science years, exceed the reading level of many. For such students learning is impeded rather than facilitated by the assignment of reading from standard texts. Manual dexterity also varies from student to student, but there is little evidence that this is considered in the assignment of laboratory work. For those with meager aptitudes of this sort, the laboratory method of instruction may discourage rather than support learning.

The physical setting should also influence the selection of method. To lecture to 40 students in an airless room designed for 30 is to court boredom if not asphyxiation. To use a motion picture or slides in a room that cannot be darkened often leads only to eyestrain. If these examples seem too ridiculous to mention, the reader is invited to make a tally of the frequency with which physical setting is inappropriate to the method or material employed by the medical instructors he observes.

The teacher's skill with specific instructional tools should also influence his selection. While it is true that some teachers cannot lecture, some cannot lead discussion, some cannot manipulate audiovisual aids, some are unable to use a blackboard, and some should not attempt to do any of these things, it is equally true that these are skills which most people *can* learn even though a great many are unwilling to make the effort. On the other side of the coin is the teacher who has developed unusual proficiency in the use of a given tool and is able to achieve with it goals that a less artful person would be foolish to attempt. For example, the objective most readily accomplished by the lecture is transmission of information, but in both *Julius Caesar* and *Coriolanus* Shakespeare has described lecturers whose skillful presentations altered attitudes of a whole population.

What students have come to expect cannot be ignored in the selection of materials and methods. If they have become accustomed to a technique which lays the facts on the line, they will feel insecure, rebellious, and cheated if an instructor suddenly challenges them by group discussion. The instructor may resent this reaction, but it is essential for him to recall that his major goal is to provide an environment in which students may learn and that any significant degree of anxiety blocks learning. This does not mean that student expectations should dictate the selection of materials and methods. It does mean that an instructor must be aware of the side effects of his choice and must help students to find confidence and security in the less as well as the more familiar paths.

The time for pre-planning cannot be overlooked in the selection of the instructional tool. Most teachers are familiar with the original time investment required for preparation of a lecture, and the comfort of knowing that, once prepared, the lecture can be used frequently with less time-consuming modifications; but few are as familiar with the time that must be spent preparing for effective group discussion. Furthermore, many overlook the fact that planning time for demonstrations must include that required to arrange for the presence of equipment which operates properly, at the right moment. (An endemic disease among medical instructors is the unfounded belief that the slide projector will be there, with the proper carriage, a light that works, and a lens of proper focal length whenever their whim suggests its use.) The availability of instructional materials will also influence the frequency of their use. When a patient presentation is the most suitable way to illustrate a point, a less appropriate method may be substituted if getting the patient to the demonstration area is time-consuming or blocked by ennui of the staff.

One of the most important items in the selection process is the motivation of the teacher. If his motivation to do a superior job is encouraged by the knowledge that such performance will lead to significant rewards, academic or financial, he will be inclined to be more thoughtful and painstaking in the selection of the best instructional tools for the task at hand. This is particularly important in a professional

school where the pressures upon faculty for research and service are so high.

It is such considerations that ultimately determine the nature of the instructional program. There is nothing original about them. They are even rather obvious. But most of us teach as we were taught, or in a pattern long established in our school, or without knowing really why we do what we do. The obvious has been spelled out, in the hope that it may lead to a reappraisal of the nature of our instruction and to reflection about alternatives.

At the risk of oversimplification it may be said that the purposeful thread running through the educational program in medicine is the provision of opportunity for the student to acquire the information, the attitudes and the skills that will allow him to embark upon an action pattern which will bring to successful resolution the medical problems he identifies as a physician. There are many paths from problem identification to definitive action. In his monograph "Theory of Valuation" (1) John Dewey describes several methods by which this movement may take place.

The first is habit, which requires volition but not thought. It is fortunate that we develop habits, for otherwise most of us would be exhausted by 10 o'clock each morning. Even the simple maneuver of tying one's shoes would be frightening to contemplate if it were necessary to think through each step in the process every time it was carried out. Habits are indispensable if the mind is not to be immobilized by minutiae. The conscious acquisition of useful habits is most readily accomplished by drill.

A second method also dispenses with conscious thought. It was labeled Standard Operating Procedure by the armed forces but may be known in other settings as custom, tradition, or folkway. Here a set pattern of action has been established by an individual or group that has determined this to be the most appropriate, the most efficient or the most expedient means to accomplish a given goal under a given set of circumstances. It requires the individual only to identify the problem after which he is set automatically into motion.

Third, the movement from problem to action pattern may be dictated by rationalization, which requires thought but not reasoning. Rationalization may underlie the prescription of a drug in the knowledge that it will probably do no harm and may do some good, or in the conclusion that the relationship between cigarettes and bronchogenic carcinoma is entirely fortuitous. Emotion may encourage the kind of action pattern which led to the wholesale destruction of dachshunds during World War I. Or an action may be prompted by reflex, as in the abrupt withdrawal from a hot stove inadvertently touched.

Finally, there is the method of critical thinking. Here an action pattern is adopted only after a problem has been defined by observations, hypotheses regarding its solution posited, data gathered as these hypotheses are tested, and conclusions drawn from the data. The action which results will be further subjected to critical analysis as it is carried through.

The student who is regularly encouraged to approach problems critically may ultimately develop the habit of critical thinking. However, if his actions are always the habits of others, if he adopts standard operating procedure or accepts tradition without question, if he is emotional in his response or accepts the pattern of rationalization, the time may come when he is no longer able to engage in the critical thinking which is so much more difficult but so crucial to the solution of most problems a physican faces. The medical faculty member in any department should ask regularly whether his instructional materials and methods contribute to the development of this quality or are instead encouraging those less taxing methods of movement from problem to action.

The opportunity for critical analysis is often regarded as a major asset of the laboratory and the clerkship experience. It may not be amiss to examine these to see whether

they do indeed achieve such a goal. Let us turn first to the laboratory.

> Typically, the pupil is supposed to have a problem when he enters the laboratory to work. Typically, his assignment takes the form 'to prove that so and so takes place under the given set of conditions.' He is issued a set of equipment and spends his time in the laboratory deriving a set of objective data which presumably will support the proof at which he is trying to arrive. He tabulates his data and forms a generalization based upon the tabulation. He then compares his data and generalization with similar experimentation carried out by expert scientists and recorded in the science textbooks.
>
> Science teachers in general have defended the laboratory procedure described above as valuable for training pupils in the use of scientific methods. As a matter of fact, such an approach may be questioned from the point of view of training in the use of scientific methods. In the first place, the pupil is not truly proving anything new and is not dependent upon his own laboratory resourcefulness in arriving at a solution to a problem. Most laboratory assignments propose to have the pupil prove something which has long since been proved, and they deal with ideas or laws that are commonly recorded in science textbooks. There is really no 'research.' The pupil does not depend upon his own methodology, his own data, or his own conclusions. He works toward what he has previously accepted as true. What he does get is added direct sensory experience and observation dealing with concrete things. He can manipulate apparatus, smell chemicals, see color changes take place, feel the pull of forces. Such laboratory exercises provide for objectification of experience but not for experiences with sound investigative techniques (9).

This quotation purports to describe the science laboratory of the secondary school, but both the description and the questions it raises are succinct and germane to laboratory instruction at the medical school level. Do the majority of laboratory exercises in medical schools really encourage students to develop critical thinking? There is no good evidence that they do; neither is there evidence to the contrary. The literature on appraisal of laboratory instruction deals only with the secondary school, but here, at least, the only demonstrated advantage of direct laboratory experience is in the development of skills in the use of laboratory equipment. In the acquisition of information and understanding, in the retention of these acquisitions, there is no significant difference between direct laboratory experience and the more economical and less time-consuming laboratory demonstration. It would be unwise to transpose these conclusions to the medical school laboratory exercise, but it would be equally unwise to ignore them and to assume that it is, in fact, doing something different.

Here and there medical school laboratory experience takes a quite different form in which the student does attack a problem of considerable personal significance to which the solution is known neither to him nor to his instructor. Under these circumstances he must make his own observations, set his own hypotheses, test them and accumulate data from which conclusions may be drawn. In this instance the equipment of his own mind and that of his teacher, as well as the facilities of the laboratory and the library, must be exploited in his search for a way and an answer. He may not conduct as many experiments, he may not reproduce the work of as many earlier investigators, he may not cover as much subject matter as he might have done in classical laboratory exercises, but if the objective has been the development of critical thinking, he has at least had an opportunity to acquire that skill.

This is not to say that such opportunity is completely absent from the traditional laboratory, but objective observation of laboratory instruction raises the question of how frequently the opportunity is exploited. In many laboratories the instructor seems to wander aimlessly, awaiting a question or the appearance of some technical difficulty in the experimental procedure. When these are brought to his attention the instructor is often inclined to answer the question or do for the student what the student might with guidance do for himself. Challenge, stimulus, encouragement to analyze the problem seem far less common than answers or reference to what the labo-

ratory guide says. This reaction may result from a student load that is too large or to a different understanding of the objective. The instructor may also be unaware of, or unwilling to accept, the fact that students learn at different rates. To expect all students to do the same things in the same period of time is unrealistic. A laboratory designed to the pace of the average will bore the gifted and frustrate the slower student who is unable to achieve what is expected of him.

To be most successful the laboratory should probably be an individual workshop where the student can move at an individual pace and do something that he has been helped to recognize as an important contribution toward the achievement of his ultimate goal. It is here that his individuality can come to the foreground, and a magnificent opportunity for learning, rather than for completing an assigned task, can be provided.

Now turn to the clerkship. There is no setting in the medical school which is more soundly designed to capture and challenge the medical student, and it is generally assumed that this is one of the more successful instructional methods by which medicine is taught, although no controlled studies are available. The question which we would explore is whether this teaching setting actually encourages critical thinking or those alternate methods of moving from problem to action pattern which have been noted.

Traditionally, the clerkship is based upon a patient work-up by the student, followed by presentation to the instructor and a joint analysis of the problem. Observation of this process makes it evident that in many cases the instructor has already determined for himself an action pattern, while the student is still wallowing in a morass of confusion and indecision. The instructor has reached this point not through the immediate application of critical thought, but as a result of habit. He has encountered the same problem so many times, has been through the process so frequently that he now moves to decision with great speed. And he may be inclined toward impatience with the student who cannot negotiate the path as swiftly. When such impatience appears the instructor may suggest the conclusions the student should draw and the action he should take. This means that he is asking the student to follow a standard operating procedure rather than to engage in a critical analysis of the problem. If the instructor is seriously concerned with encouraging critical thought, he will take a different tack. He will inquire about the conclusions that can be drawn from the evidence available, he will ask whether further data are needed, whether alternative conclusions might be tenable, whether there are still problems unidentified. Such questions do not aim directly at the disease process or the therapy. They are designed to assist the student to acquire the skill of critical thinking on the basis of disease and therapy. This does not overlook the fact that the student must ultimately draw a sound conclusion and take diagnostic or therapeutic action.

There is a price which must be paid for such instruction. It takes patience and it takes time, neither of which is in oversupply in a medical school. The instructor may find it difficult to curb the speed with which he moves from problem to solution through the habits he has developed by long experience in critical thinking. If problem solving is the goal, however, the student must have an opportunity to develop his own sound habits; otherwise he will mimic habits of his instructor without analyzing their meaning. It is also worth noting that a single instructor cannot operate alone in this fashion. If he does he will be a lonely and often a disheartened man surrounded by hostile and rebellious students who want answers without questions, habits without challenge, standard operating procedures without thought. This is the easier way and the pattern of instruction in many schools. Adherence to the goal of critical thinking must be an institutional policy, not that of an individual alone.

The critic may think this another manifestation of the educationist's overconcern with process rather than content. It must

be obvious that critical thinking requires subject matter, however. The student who does not have enough information will find it necessary to acquire more if he is to face the challenge, but the information is in the context of a problem rather than in the realm of free floating fact. Information *is* important. The ability to use it wisely, effectively, and critically is equally significant.

On several occasions reference has been made to the need for student involvement in the educational program if maximal utilization of the experience is to be achieved. In most areas of higher education the student is expected to become involved only after the program has been defined and organized by the faculty. Any alternative to this pattern has probably occurred to very few members of a medical faculty, for the majority share a sincere conviction that they know what the student must have, that the student is too inexperienced to have any concept of what he needs, and that what he wants is colored more by romantic than realistic notions of the nature of medicine. Yet, a medical faculty which honestly accepts the individuality of students, the differences between their individual motivations and abilities and goals must realize that it is probably not possible to advance a single program year after year with the expectation that it will be of greatest effectiveness for all.

The suggestion that students might have a voice in planning a course of instruction may lead to an outraged cry by faculty members who interpret this not only as an infringement upon their right but more importantly as a dereliction of their duty. One can only point out that this is a misinterpretation of the suggestion. Wise student-teacher planning involves *both* student and teacher, not either alone. The method is common when a student engages in project work. He and his instructor work together to devise a course of study that will lead most directly to a goal upon which they have agreed. With a larger number of students it may be more difficult to carry out such joint planning, but it is not impossible. It requires an instructor who is willing to accept the fact that there may be more than one road to Rome, and more than one vehicle in which to travel it. Before selecting the route, however, students and instructor must together agree that it is Rome, and not Pisa or Parma, which is truly the goal. We usually assume that the student entering upon an experience such as the Out-Patient Department clerkship understands the objectives of the experience. Yet it may be that his objective is to see as many patients as possible, while the instructor's objective is to have the student provide detailed comprehensive care for relatively few. If this conflict is never resolved, or even worse never voiced, they may both leave the encounter thwarted and angry. To varying degrees such misunderstanding occurs in any course when no student-teacher planning of means as well as ends has taken place.

No teacher should look upon this as an easy way to relieve himself of responsibility for organizing a course. The involvement of students in course planning will require more instructor time for pre-planning than would be true in the more traditional scheme, because he must among other things be prepared to suggest a variety of alternative methods to achieve the goals agreed upon. The instructor will understand that this variety of experience is not suggested for the sake of variety alone but in the knowledge that individual students and groups of students have different wants, needs, abilities and motivations. If these differences are to be used to facilitate learning rather than as an impediment to learning, then alternative opportunities must be offered in order that what is most useful for the particular student or group may be identified and selected. If the instructor is not convinced of this, or if he feels secure only when using one instructional method, or if he believes firmly in the use of only one kind of learning experience he should not, and probably would not, consider any planning with students. For student-teaching planning to be suc-

cessful the teacher must be interested in the student's suggestions and willing to accept a joint decision if he offers them an opportunity to participate in the decision. If he has any reservations, if there are limits within which the decisions must be made, these ground rules must be announced in advance. Otherwise he will, in the end, be placed in the untenable position of telling the students what to do after having encouraged them to participate in the planning process. The whole operation, then, becomes a sham.

Recognizing the risks of generalization, let us now attempt on the basis of all that has gone before to characterize the "good" teacher. In general he will be concerned with the four broad areas noted at the beginning of this exposition: objectives, subject matter, materials and methods of instruction, and evaluation devices. He will not only know what it is that he is trying to do, but also what his department is attempting to do and how these goals relate to those of the institution as a whole. On the basis of these objectives, rather than as a result of tradition or availability or unreasoned personal preference alone, he will select the materials and methods of instruction. Having selected them wisely he will use them with the professional skill he has acquired as well as that with which he was born. He will be aware of individual differences among students and will behave in a way which manifests his sensitivity to their needs and their problems. He will keep constantly in mind that talking is not equivalent to teaching, nor listening to learning. He will be aware of the physical and emotional as well as the intellectual setting for learning. He will not hesitate to challenge students, nor will he fail to discuss with them their strengths and weaknesses for the purpose of improving the quality of their learning. Finally, he will be anxious to find, to develop, and to use tools of measurement which are appropriate to appraise student progress toward objectives which he and the students have commonly understood from the outset. When this appraisal indicates that students have not progressed satisfactorily he will look as critically at the environment for learning which he has created for the students as at the students themselves.

Such a paragon is probably no more real than the average man, and it would be preposterous to say that without all these qualifications a man fails as a teacher. It is more useful to regard such a characterization in terms of "all other things being equal." All other things being equal, the teacher who organizes and presents material clearly will be more effective than one who does not. All other things being equal, the teacher who has clearly defined his goals will be more effective than one who has not. With this qualification the characterization may be helpful rather than ridiculous; and it may identify for individual teachers some of the ways in which they might improve their performance.

EVALUATION OF STUDENTS AND PROGRAMS

From the beginning to the end of his formal education a student is beset by examinations. He may accept them as inevitable, but he rarely agrees with their purpose, their worth, or their fairness—nor is he alone in this doubt. Many teachers are also troubled by the process of evaluation and the meaning of data accumulated through standard evaluative devices. Medical teachers share this concern and manifest it by sporadic warfare over the comparative worth of essay and objective examinations, the good and the evil of grades, or the role of the National Board of Medical Examiners in the appraisal of student accomplishment. There are no easy answers to these questions, but some may be suggested by an inquiry into what evaluation is and what purpose it serves.

As the word suggests the process begins with a definition of those things which are of value and proceeds to the rendition of

a judgment regarding the degree to which these things have been achieved by students engaged in a program of study. By defining what they value a faculty spells out the objectives of a school, a course, or a unit or work. These should include an annotation of the minimum body of information which is acceptable, of the understandings which are required, of the specific skills and attitudes which should be acquired by the student who engages in the program. It is neither necessary nor realistic to expect that all the goals will be served by each segment of the program or that all will be evaluated by each tool which is used; but at some place in the program each of the objectives must be served and some appraisal made of the student's acquisition of these qualities.

Appraisal, which is the second step in evaluation, must be made on the basis of criteria. If an objective is to help a student acquire the skill of tying a square knot the faculty must also define the criteria by which they will judge whether he has acquired that skill. They may agree that the criterion will be his ability to describe a square knot, or his ability to identify the square from the granny knot, or his ability to tie a knot which is, in fact, square. But they cannot, willy-nilly, use different criteria for different students and assume that they have appraised the same quality.

The delineation of objectives and the development of criteria lead directly to the third part of evaluation—which is the development and application of an instrument to measure those qualities which are valued according to the criteria that have been agreed upon. It is only after the first two steps have been taken that an appropriate decision may be reached whether to use an oral or a written examination, subjective or objective, long or short. And unless such steps are taken it is only by chance that the measurement device will actually serve the objectives or measure their achievement by the students.

The determination of objectives and the criteria for their achievement is a task each medical faculty must undertake for itself. It is a task that requires cooperative action by the faculty as a whole, for without consensus it may develop that individual faculty members are working toward quite different objectives or appraising student progress according to criteria that may be theirs alone. Our discussion then must be limited to the stage of measurement, and to an analysis of the instruments commonly used to determine student achievement in the general areas of information, understanding, skills, and attitudes.

The pencil and paper test is by far the most common measurement device at any educational level, and the "essay examination" is the base-line for all other written examinations. The essay examination generally provides the student with an opportunity to discuss, to explain, or to list certain items of information which have been touched upon in the course of study. It is a device to provide the examiner with some indication of the student's level of knowledge, and often some insight into his understanding as well. There is an underlying assumption that because a student is able to give the correct answer he has gained the information. This assumption may be justified in most instances, but all teachers are acquainted with the student who "crams" himself so full in the hours just preceding an examination that he is able to turn in a fine performance only to lose by sundown what has served him so well. There is often an additional assumption that the student's ability to answer questions about fact is equivalent to his understanding of that information or his skill in using it. Since these are different qualities from that being tested it is very likely that the assumption is unjustified.

One of the greatest problems in the use of essay examinations is the scoring. In some instances the student response may be clearly right or wrong, but this is almost rare enough to be reportable. In most cases there are degrees of rightness and wrongness where scoring requires that judgment be exercised. It is clear to any teacher who has picked his way through a pile of 50 essay examina-

tions that the judgments at the bottom of the pile were different from the judgments at the top; that the judgments of clearly legible responses were sometimes different from the judgments of those which required deciphering; that judgments sometimes depended upon the length of an answer not upon its clarity, upon the skill of grammatical expression and not the content, upon the time of day or the degree of fatigue or the state of digestion. It has been said by some experts that the "grade" on an essay question can be raised as much as 25 per cent by giving a concise legible answer in the first paragraph, enlarging upon this with increasing illegibility for several pages, and concluding with a concise and legible summary paragraph. If this is so then factors other than information and understanding are being measured by the essay examination. This is all to the good if such is the purpose of the examination; but if the purpose is to gauge the accumulation of knowledge and understanding then it would be fallacious to confuse this with the test-taking skill of the clever student.

Some of these difficulties can be avoided by defining *in advance* what constitutes a good answer, as well as how a correct but unanticipated response will be judged. The device of using several independent judges, of scoring all responses to question 1 before proceeding to question 2, or of blocking out the name of the student before examining the response may serve to increase the reliability of the instrument, but not to a very high level.

It was these limitations of the essay examination which led to the development of "objective" tests, a development that has now become a multi-million dollar industry. These tests are chiefly of the short answer, true-false, multiple choice, completion and matching types. Like the essay examination they are best used to test a student's accumulation of information, but unlike the essay they are inclined to test his ability to recognize, rather than to recall, the information. They cannot be used to test skills nor can they, except in the most unusual instance, test attitudes. Some are said to measure understanding but one cannot accept this claim without serious reservations. Nor can their objectivity go unchallenged.

A serious shortcoming of the objective examination is the difficulty of writing good test items. The abbreviated list of maxims for item writing in Table 2 will suggest ways in which test construction may go wrong. If some seem preposterously elementary, it would be well to recall the purpose for which the examination is being given. For example, those maxims which urge the avoidance of ambiguity or verbal complexity in the questions or instructions may appear ridiculous to a medical faculty which deals with a group of college graduates who must make their way in a verbal world. But if the purpose of the examination is to determine how much knowledge of biochemistry or surgery the student has acquired then the issue should not be confused with the issue of how well he can read, how readily he can comprehend the instructions, or how quickly he can carry out the operation called for. As an illustration let us cite the directions for a currently popular objective question form:

> Answer:
> A—if the statement and proposed reason are both true and related as cause and effect.
> B—if the statement and proposed reason are both true and are not related as cause and effect.
> C—if the statement is true but the proposed reason is a false statement.
> D—if the statement is false but the proposed reason is accepted fact or principle.
> E—if the statement and proposed reason are both false.

The purpose here is to measure the student's information and his ability to establish relationships (which is understanding); but it also will give a premium to the student who is able to comprehend and to follow these directions easily and exact a penalty from the student who is unable to do so. Such premium and penalty are justifiable *only* if these are the abilities to be measured. Otherwise, the result may be misleading.

Another maxim suggests that a test item

should not be lifted verbatim from the text. The reason is probably apparent. Most teachers know students whose photographic memories would allow them to score handsomely if asked to complete such an item. If the examiner is testing for sentence recognition there can be no objection, but if he is testing for information he may be misled. The trick question is also to be avoided unless the purpose of the examination is to determine a student's ability to avoid traps. Since this objective is not among those commonly held by medical educators it would seem purposeless to test for such skill.

To recapitulate, the pencil and paper test, essay or objective, even when thoughtfully conceived and carefully constructed, can do little more than measure a student's accumulation of information. This it does more efficiently than any other measurement device. Since the acquisition of a body of

TABLE 2

MAXIMS ON ITEM WRITING

1. Try to avoid ambiguity of statement and meaning.
2. Keep the verbal difficulty of items low, in relation to the group who are to take the test, unless the purpose is to measure verbal and reading abilities.
3. Do not lift a statement verbatim from the text to make an item.
4. Avoid trick and catch questions, unless the test has a specific purpose of measuring ability to keep out of traps.
5. In planning items for a test, care must be taken that one item does not provide cues to the answer of another item or items.
6. In a set of items, let the occurrence of correct responses follow essentially a random pattern. Avoid favoring certain responses (i.e., True or False, or certain locations in a set of responses), and avoid systematic response patterns.
7. In items based upon opinion or authority, the items should indicate *whose* opinion is being reported or *what* source relied upon.
8. The final form of the test should be organized in some logical manner, e.g., subject matter, type of item, item difficulty (easy to hard), etc.
9. Items designed to measure the ability to apply principles should use novel situations.

TRUE-FALSE

1. Beware of such specific determiners as all or none (cue to a false statement) or generally, usually, some, sometimes (cue to a true statement). If used, use so that correct response is not in line with a determiner.
2. Beware of negative statements, since the negative may be overlooked in reading.
3. Avoid double negatives.
4. Do not include two or more ideas in one statement, especially if one is true and one is false.
5. Avoid long and involved statements, since these tend to become measures of reading comprehension.
6. Beware of giving cues to answer by length of item. There is a tendency to make true items longer, because of the necessity to qualify the statement.

MULTIPLE-CHOICE

1. Each item should *pose a significant problem* relating to a significant aspect of achievement.
2. The problem presented in the stem needs to be expressed clearly, accurately, and completely.
3. It is usually desirable to express the problem in positive form.
4. The material presented in the stem of the item should all be relevant to the solution of the problem, unless a specific purpose of the test is to measure ability to sort out relevant material.
5. As much of the item as possible should be gotten into the stem. The response options should be as brief as possible.
6. Each item should have a good and accurate answer.
7. No item should have more than one good answer. (Except for special items where the student is to mark more than one.)
8. The misleads should all function, i.e., should all be sufficiently attractive to appeal to some of the least able in the group.
9. Every response option should be grammatically correct as a completion of the stem.
10. The response options should be as nearly in parallel form as possible.
11. Avoid cues to the correct response based on length of the correction option.
12. Irrelevant verbal cues should point to the wrong answer, never the right answer, so that the person who relies on them will get the item wrong.
13. From the point of view of format, it is better and clearer if the response options come at the end of the statement.
14. Beware of negatively discriminating false options, i.e., those that will be more attractive to those with some knowledge than those with none.
15. Options which are "similar" make items difficult; options which are dissimilar make items easier.
16. Items may be made more difficult by including "none of these" as an option. Or, the options may consist of combinations of selections.

knowledge is an important goal of medical education it is probable that there will always be a place for the written examination. Since information is not the only goal, in order to measure the development of understanding, skills, and attitudes other tools must be utilized. One of the most common of these is observation, which in some schools may be the only intramural method of appraisal used during the clinical years. Typically, an instructor is asked to rate the performance of students as they complete a service assignment. The rating procedure illustrated in Table 3 may seem eminently reasonable, since it is so common. But a question must be asked: upon what criteria are these judgments made? Experience has demonstrated that instructors are inclined to rate highly those students who most closely resemble them or their self-image, and to depreciate those students who depart from this standard. Since there is no consistent intellectual or non-intellectual characteristic of medical teachers as a group, such ratings may give a more accurate description of the teacher than of the student's progress toward the goals of instruction. Indeed, it is rare in clinical disciplines to have these objectives even roughly defined. This means that neither student nor instructor is entirely clear about the purpose of the experience. Under these circumstances the instructor's response to the request that he rate a student as excellent, good, fair, or poor will depend upon his ill-defined and unspecified objectives which may bear only the faintest resemblance to those of a colleague in the next ward. This leaves the student in the position of having to guess first what this teacher wants, then trying to move in that direction until he meets a new instructor, when the game must start again.

Neither observation nor judgment need necessarily be this undisciplined. With careful thought it is possible to define the objectives of a clinical clerkship in terms of specific behaviors and to outline the criteria by which the development of these behaviors might be judged, after which appropriate instruments of measurement can be devised. To illustrate the point, every clinician would agree that one goal of the clerkship is to assist the student to gain skill in the elicitation of a medical history and the performance of a physical examination. In most clerkships the instructor judges these skills by reading the history and physical examination the student has written or listening to the student present this information verbally. These will certainly give him an impression of the quality of the student's recording or his presentation, but it will give him very little information about the student's skill in taking a history or carrying out a physical examination. To determine this the instructor must watch and listen as the student goes through these maneuvers. His observation will be more critical and more complete if the observation is directed by a *check list*. This will encourage him to note such specific things as whether the student elicited the chief complaint, developed the history from this beginning, allowed the patient an opportunity to talk, went through the system review routinely or in a manner which related to the patient's illness; whether the extra-ocular movements were determined, whether the lens as well as the retina was examined, the point of maximal impulse palpated as well as the borders of the heart percussed, and whether these were carried out in a systematic or haphazard fashion. The check list merely makes explicit what is otherwise implicit and provides a recording method that leads

TABLE 3

DEPARTMENT OF MEDICINE

Dr. .....
Student .....

Superior
Above average
Average
Below average
Unsatisfactory

Please check one category for your impression of the Clinical Clerk under your supervision on the wards.

to more reliable observation. Of equal importance is the fact that the check list can be used later to help the student learn where his technique requires strengthening.

The use of a check list calls for almost no judgment by the observer; either the student carries out a maneuver or he does not. However, there is a dual responsibility in the appraisal of student performance in a medical school: the first is to accumulate information with which the faculty may help the student to become more proficient; the second is to guard society from the dangers of ill-prepared physicians. Thus judgments must be made. These judgments must be as precise as it is possible to make them. This requires the development of criteria, for otherwise the judgments will be loose, unsupported, subjective, and often inaccurate. It is true that judgments are always made on the basis of criteria, but if these are not spelled out they will almost certainly vary from one instructor to another, in which case students will be judged according to individual rather than commonly accepted and cooperatively developed criteria which support the objectives of the program. Thus, observation may be further refined by a ***rating scale***, which not only focuses the observer's attention upon specific items but allows him to make judgments on the basis of specific criteria.

Before developing a rating scale for a specific purpose it is essential to determine what characteristics can best be measured by observation. For example, there are better ways than observation to test students' knowledge. Having decided what can be measured through observation of a specific operation, then the criteria which describe the varying degrees of proficiency of such action or attitude or understanding must be developed. The more specific the criteria the less opportunity for observer impressions to creep in, and the greater the certainty that each student will be appraised according to the same criteria.

In the first illustration of a rating scale (Table 4) few criteria are provided. Instead, attention is directed to specific items which illustrate the objectives of the out-patient department clerkship. While this could be improved by the development of criterion statements, it is better than nothing, since it allows judgments to be based upon the specified objectives of the experience rather

TABLE 4

OUT-PATIENT DEPARTMENT

STUDENT EVALUATION

	Highest			Lowest
Knowledge:				
Of clinical features of disease process under consideration.	.....	.....	.....	.....
Of underlying principles of altered structure and function.	.....	.....	.....	.....
Skill:				
Does history adequately elaborate the patient's complaints?	.....	.....	.....	.....
Is history perceptive in exploring alternative possibilities?	.....	.....	.....	.....
Is physical examination performed accurately?	.....	.....	.....	.....
Are requested laboratory tests appropriate?	.....	.....	.....	.....
Are findings adequately recorded in the chart?	.....	.....	.....	.....
Understanding:				
Are history and physical examination synthesized into an appropriate diagnosis?	.....	.....	.....	.....
Has student developed a therapeutic program in keeping with this synthesis?	.....	.....	.....	.....
Does student evidence an understanding of patient's total needs?	.....	.....	.....	.....
Attitudes:				
Does student make use of available consultation facilities?	.....	.....	.....	.....
Having identified the goal of the program does student assume responsibility for its fulfillment?	.....	.....	.....	.....
Do his actions indicate a sincere respect for patient's needs?	.....	.....	.....	.....

than upon poorly understood or not commonly accepted goals. The second illustration (Table 5) is taken from a rating scale for an interview. The descriptive statements make it possible for the interviewer not only to focus attention upon specific performance but to place the interviewee in the appropriate category on the basis of specific behavioral characteristics.

The development of such an instrument may be very time-consuming. Once developed, however, it may be used over a long period of time. Careful review of the scale should be carried out at regular intervals, but unless the objectives of the program have undergone striking change it is unlikely that major modifications will be necessary. It must also be pointed out that such a scale will be much more widely and much more effectively used if it is cooperatively developed by all those who will employ it. If this ideal cannot be accomplished it is essential that all who are asked to use the scale become familiar with its purpose and its design before they apply it.

There are other methods not widely used in medical schools which can also contribute to wise and thoughtful appraisal of student performance. One is the *anecdotal record*, which demands regular brief notation of significant student behavior by the instructor. By the end of a month, a year, or a course such a collection of anecdotes will provide an insight into the student's performance which would otherwise be lost. Such a method is practical only when an instructor works with small groups of students, but under these circumstances there are literally hundreds of things which he might record about each individual. It is unrealistic to expect such a monumental record, and the instructor must exercise judgment in selecting items for inclusion. If he records only a student's failures the resulting picture will be as unbalanced as if he records only the student's brilliant ploys. The purpose is to provide a collection of anecdotes which describe the man, not merely one side of him. Most instructors now use such a method in the appraisal of students, but they rely upon that notably unreliable instrument, the memory, for the anecdotes which have provided them with cues to the student's attitudes, habits, and skills. Anecdotal records are surely inadequate to determine whether the student has achieved all the goals of the educational

TABLE 5

THE APPLICANT'S SPEECH

0 10	Used a poor and limited vocabulary; mispronounced words or mis-used them; used bad grammar; mumbled; speech defect; spoke in a rasping, grating voice. Communication became exceedingly difficult. Speech such that it is obviously disqualifying.
10 20	Sentences were choppy or involved; repetitive; used stilted or flowery language; has a peculiar or unpleasant voice, which may be monotonous, shrill or high-pitched; had a strong foreign accent; used slang or profanity that added no force to his words; lisped or slurred words; said "and—aaa" or "er" frequently; qualities of speech tended to distract listener or cause him to lose interest.
20 40	There was nothing particularly appealing or especially repulsive about his speech; tended toward overtalkativeness; was brusque; hesitated or plunged ahead in discourse without duly considering what was being said; voice was too low-pitched; drawled or clipped words; or slurred sentence ends; was inclined to ramble; nothing outstanding about his speech—either way. Just so-so.
40 70	Speech was fluent, effective, persuasive, showed some assurance without overdoing it; chose words carefully; showed imagination in choice of words and in organization of what was said; conversation was usually lively; diction was good; manner of speech inspiring. In sizing up this candidate one would recognize speech as a strength.
70 100	His speech made communication very effective; in fact the interviewer was loath to close the interview. Used excellent grammar in an easy and natural way; placed emphasis on words that required emphasis; exhibited an extensive vocabulary; spoke without hesitancy even when "placed on the spot." Had a forceful voice; showed considerable imagination in choice and use of words; spoke clearly and distinctly.

program, but they reinforce the appraisal of those things which are best appraised by observation.

Since a major purpose of evaluation is to guide the student in his further learning, it is wise to gather together in a single, cumulative record for each student all the data, obtained from interviews, questionnaires, test results, anecdotal records, rating scales, and check lists. This file should then be readily accessible to members of the faculty. The teacher who becomes concerned about an individual student who is having difficulty with a specific body of information, or working with one kind of patient, or who blows up under stress will find in the cumulative record a wealth of information about the student's background and past performance. From this he may gain new insight into the problem that will allow him to be more useful to the student as they work together toward correction of the student's deficiencies. This is a touchy and sometimes explosive matter, for there are administrators who believe that such information is privileged and not to be divulged to the faculty. There are also faculty members who would hesitate to record certain facts about students if they believed that other members of the staff might see them. Each of these viewpoints reflects some lack of confidence in the ability of faculty members to handle such information in a professional manner. It is particularly alarming to discover this attitude in a medical school which is devoted to the development of physicians who must carry the burden of privileged information all their lives. It is also shocking to find that the information which is kept from the faculty is readily accessible to the clerical staff of the Dean's office. There may occasionally be information that should not appear in a student's record, but this should be rare. If teaching is a professional responsibility, then teachers must be privy to all the information which will allow them to understand their students and to help them to learn, for this is the purpose of the school.

Up to this point our discussion of measurement instruments has been largely descriptive. The data accumulated through these devices must be interpreted, and the interpretation will depend in large part upon the validity and reliability of the instrument. Validity is an encompassing term which refers to the capacity of an instrument to measure what it is supposed to measure. Reliability is achieved by such an instrument when it measures something consistently under a variety of conditions. The determination of validity is beset by many problems, which begin with a definition of objectives. If we say that students must have "requisite knowledge of . . ." then the first step in the development of a measurement device is definition of "requisite." Once this has been accomplished an objective examination may be created to test whether students have in fact acquired this knowledge, and the results may be subjected to statistical analysis which leads to a decision concerning validity. This statistical analysis is rarely if ever carried out on teacher-constructed examinations, although it is a regular feature of the development of standardized tests. Instead, we accept the notion of face validity, which means that if an examination is answered in a given way then it is certainly measuring what it should. We say "I'm sure this physiology test is measuring what it is supposed to because every question deals with the physiology covered in the lecture or laboratory." This is an acceptable compromise as long as the teacher recognizes the assumption that the test is valid because he says it is valid. It must be evident that validity decreases strikingly as one passes from written tests of objective type, through the essay examination, to rating scales, interview, and unguided observation. It is the last which is the most common method for the appraisal of clinical performance. This means that we accept the assumption that the student is a good (or poor) clinician because the teacher says he is, an assumption that may not withstand careful scrutiny. Since validity can be significantly increased by the definition of criteria for appraisal, the development of such criteria should command the attention of clinical

instructors everywhere.

As in the case of validity, there is descending *reliability* of measurement devices as one passes from the objective examination to unguided observation. Like validity, reliability will also increase with the specificity of criteria. What one instructor calls "good" may strike another as "excellent" or a third as "fair." If it is agreed that a student's performance of the physical examination is "excellent" if he proceeds systematically from head to toe including the elicitation of proprioceptive reflexes and dilating the pupils for the funduscopic study, "good" if he covers all of the parts but in a haphazard manner and fails to dilate the pupils, "fair" if he is either systematic or haphazard but omits the eye ground examination or testing of proprioceptive reflexes, then there is much greater likelihood that two instructors observing the same performance will agree in their appraisal.

The reliability of all measurement instruments is influenced by what might be referred to as contamination factors. A few examples may serve to illustrate this point. In the case of written examinations a major contamination factor is reading ability. The student who does poorly on a timed examination may have no less knowledge than his peers but quite simply be unable to read as rapidly or gain information as quickly from his reading. This would not contaminate the result if the purpose of the examination were to determine reading speed, but if the purpose is to determine the knowledge of microbiology then the reliability of the outcome is subject to question. Directions which are not clear or are subject to misinterpretation will also contaminate scores. An ill-defined quality called "test taking ability" may profoundly alter the outcome of an examination: the man who panics, grows tense, or loses his ability to reason under the pressure of an examination will not do as well as the one who is relaxed and at ease even though their knowledge of the subject matter is identical. There are those who will say that the student's ability to follow directions and to stand up to pressure is also important to test. If this is so then devices designed to test these qualities should be used. To draw conclusions about these skills from a device designed to test a student's knowledge of subject matter is unjustifiable; and to draw conclusions about a student's knowledge of subject matter if these other factors are strong contaminants may also be unjustifiable.

There is also the "halo effect" which may influence the scoring of either written examinations or observational ratings. This may be illustrated in an investigation conducted by four students in the huge English composition class of a great university. They had noted that the grades of those who got 75 on the initial weekly compositions continued to cluster around that level, while those who had started at 95 continued to be accorded the same distinction throughout the term. Their investigation was quite simple. They submitted identical compositions in the names of four men whose grades clustered around 75, 83, 89, and 95. When these were returned the hypothesis was confirmed that the identical themes would receive four grades according to the past performance of the individual. In a similar way, as we review the recorded history of a student we know and like and come upon a misspelled word we may regard it as a slip. But when we encounter a misspelled word in the history of a student we don't know or one who has aroused our hostility we are inclined to lament, "Oh Lord, he can't even spell." Quite early in our encounter with a student we form an impression of what he can and cannot do. Then when we discover that a student we have identified as a "good" student and a hard worker fails to learn something, we help him to learn it. But when a student we have labeled as mediocre fails in the same way there is a tendency to pass him by with the thought, "He'll never learn."

Some of these contamination factors can easily be corrected; others may be more difficult. But first they must be identified as contaminants. These illustrations are used

only to point the way, not to serve as a definitive list.

With all the problems of test construction, objectives and criteria, validity, reliability, and contamination factors, how does the instructor record and communicate the result of his appraisal? By tradition he uses some symbol of achievement. Yet when he reports that a student has answered 84 per cent of the items on the surgical examination correctly, that his performance on the ward is 78 per cent, and in the operating room 91 percent, that when added together and divided by three this provides a final grade of 84.33 in surgery, what does this convey to the instructor, to the student, or even to the dean? In complete honesty one must answer that it means almost nothing, but it may convert students into symbol-chasers and faculty into symbol-worshipers. Student progress can only be determined in terms of the goals of the program, according to the criteria established for their achievement, and should be recorded and reported in the same terms. A descriptive paragraph relating the student's achievement to the specific informations, understandings, attitudes, and skills which are goals of the program will convey to the student and to those who are obliged to interpret his accomplishment far more about his strengths, as well as his weaknesses, than a letter or a number has ever been known to do.

There is another purpose of the appraisal. Like everything else which happens in the school, appraisal should serve the goal of the institution—which is to help students to learn. The measurement instrument can be one of the most effective instructional devices in the teacher's armamentarium if it is regarded as something more than a means of determining student progress. Once it has been completed the test has served its appraisal purpose, and the students are desperately anxious to learn the material covered by the examination. The alert teacher will grasp this "teachable moment," when the acquisition and retention of information will be extraordinarily high, by reviewing the examination with students as soon as possible. If the examination once given is forgotten except as a mark, a symbol on the student's record, then he is likely to seek the symbol rather than the learning which it should represent.

The observational appraisal devices that have been described may be even more effective as educational tools if they are shared with the students at the beginning of an experience rather than at the end only. Such preliminary discussion can assure that teacher and student will work toward a common set of explicitly defined objectives instead of toward goals that are merely assumed to be the same. It is the assumption that gets in the way of learning because the student finds himself trying to predict what the instructor wants rather than devoting himself to the business of learning. The instructor should make clear from the beginning both the goals and the criteria to be used in the judgment of whether the goals are being achieved. Learning is not a contest between faculty and students trying to outguess one another. It is a cooperative venture. Anything that will increase the speed or the efficiency of learning should be embraced, and those things which impede learning ruthlessly discarded.

We have touched upon the usefulness as well as the limitations of many tools of measurement, and it may be unnecessary to add a strong recommendation that none be used alone to determine a student's level of accomplishment. Nothing could be more disastrous than using even the most comprehensive device as the single determinant of what a student knows. What he knows must be measured by a variety of devices over a span of time. The objectives of medical education are multiple, and a single measure can rarely get at all of them with equal effectiveness. Even the most reliable appraisal instrument will provide no more than the picture of an individual at a given moment, and he is almost certainly different from moment to moment. Any single appraisal must also be selective. Since it is impossible to ask every question, to observe every skill, to probe every understanding in a single session, only a limited segment

of individual accomplishment can be tested each time. Despite the intrinsic weaknesses of individual appraisal instruments five or six different measures at different times will provide a more accurate and more ample definition of student achievement than any one alone.

Examinations also serve an educational purpose by telling the student what the faculty values. If the tools of measurement are of a single kind, (e.g., written examinations) and they emphasize achievement in one area (e.g., information), then the student will quickly direct his attention toward this goal even at the expense of other outcomes of education. He may end with an enormous body of information of which he has very limited understanding and without many of the skills and attitudes which would lead him to become a competent physician and a student for life. For this reason above all others appraisal procedures must be in keeping with the institutional objectives, for they announce unmistakably what the faculty prizes and thus dictate the student's approach to learning.

Up to this point we have dealt exclusively with the evaluation of student progress. Before concluding it would be well to mention the evaluation of educational programs. This is particularly appropriate in an era of extensive curricular reassessment and change. Most curricular changes are endogenously generated by individuals or faculty groups who feel some dissatisfaction with the way things are going. A new program is proposed and is accompaned by hope that it will be possible to demonstrate that such a program, once instituted, is better than that which it replaces. It is melancholy to report that this hope is often supplanted by an assumption that the new is better than the old and evaluation goes no further.

By now it may seem repetitious to say that the first step in planning the evaluation of a new program is to determine the objective of that program. If a family-care experience for first-year students is to be introduced, a decision regarding the purpose of the program must be made before one can go about determining whether this goal has been achieved. If there is interest in getting basic science and clinical personnel to work more closely in the presentation of a body of subject matter it is essential to ask first, "What for?" The objectives need not be extensive, but they must be defined. And they must not neglect the broader objectives of the institution. If the introduction of a family-care program led freshmen to learn a great deal about families but at the end of the first year they knew nothing about anatomy and biochemistry, this experience would not serve the over-all objectives of the school, although it might serve those of the innovators. Program evaluation, then, must be developed within the broad as well as the specific framework.

As a second step criteria must be developed by which the achievement of objectives can be determined. Even though such criteria are crude they will be better than none at all. For example, if an objective of a family care program is the development of sensitivity to the patient as an individual, a criterion of achievement might be the student's ability to recall the age,the general intellectual level, and the family background of a patient after a 5-minute interview. From this criterion a measurement instrument might be devised such as the University of Colorado School of Medicine series of filmed patient interviews with companion questionnaires. The questions were designed in such a way that to answer them the student must have developed this kind of sensitivity as well as diagnostic skill.

One of the errors that may creep into the evaluation of a new program is reliance upon an instrument already in use as a means of measuring progress toward goals of the new program. If the program takes as an objective increased student sensitivity to patients, and as a criterion the increased knowledge of patients' background, then an instrument such as the MCAT or an examination in Anatomy would be unlikely to provide very useful information regarding the program's impact. As in the appraisal of student progress, the appraisal of a program must develop out of the objectives and will require instruments that can meas-

ure the achievement of *these* objectives, not those of an earlier effort.

In summary, the evaluation of students or of educational programs is a dynamic process that demands clear definition of goals, careful selection of criteria, and often imaginative development of measurement instruments. The more casual appraisal of student progress may satisfy the registrar's demand for a grade, but it is unlikely to serve the student and may mislead the faculty.

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SCHEDULE

Sunday, June 15	Monday, June 16	Tuesday, June 17	Wednesday, June 18	Thursday, June 19	Friday, June 20
Morning	Introductory Presentations Coffee Discussion	Appraising Student Progress Coffee Discussion	Effective Use of Instructional Materials and Techniques Coffee Discussion	Problems of Learning Coffee Discussion	The Medical Student Coffee Discussion
Afternoon	Problems (Small Groups) Orientation to Campus	Group Discussion of Morning Topic Individual Problems—Review and Planning	Group Discussion of Morning Topic Individual Problems—Review and Planning	Group Discussion of Morning Topic Individual Problems—Review and Planning	Group Discussion Progress Reports
Evening Social Gathering Faculty Club 8:30 P.M.				Dinner Faculty Club "Japanese Art and Music"	

Sunday, June 22	Monday, June 23	Tuesday, June 24	Wednesday, June 25	Thursday, June 26	Friday, June 27
Morning	Overview of Higher Education Coffee Discussion	Techniques of Evaluation Coffee Discussion	Techniques and Materials of Instruction Coffee Discussion	Small Group Activities Coffee Discussion	Summation Criteria for Effective Instruction
Afternoon	Objectives of Medical Education Action Research	Small Groups Achievement Tests Clinical Performance Tests Public Speaking Graduate Education	Individual Projects	Reporting Interviews	Evaluation
Evening	Dinner Faculty Club "Physician, Citizen and Courtier"				

Nathan Smith Davis, 1817–1904
A Biographical Essay

OTTO FREDERIC KAMPMEIER
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After accepting the invitation to prepare a biographical sketch of Nathan Smith Davis for this journal, the writer saw that he had consented rashly, for how could anything more be added to what had been written repeatedly about him—both as a person and as a continuing force in the mainstream of American medicine. Even Isaac N. Danforth, who compiled one of the best extensive biographies[1] of Davis 3 years after his death, began the task with great reluctance, as he said, and closed it with greater reluctance. How could he write the life history of "a character so colossal," who needed the perspective of time and distance before his eminence in the medical world could be estimated fairly! He complained, too, that he was handicapped by the absence of original documents, such as private and public letters and other manuscript sources of information, all of which were destroyed, many of them probably in the Chicago Fire of 1871. Biographers today, writing about Davis more than 50 years after his death and nearly a century and a half after his birth, do stand on a vantage ground; but their portrayal of him can at best be only a reflection of the combined opinions of his contemporaries, the thoughts expressed in his published works[2] and his enduring mark on the edifice of medical education. Furthermore, since, in the nature and flux of things, most medical literature is ephemeral, serv-

PORTRAIT OF NATHAN SMITH DAVIS

Nathan Smith Davis at the age of 46 (from a photograph by Fassett, Chicago). All existing portraits of Davis, beginning with the one at 30, when he had accomplished the establishment of the American Medical Association, to the one a few weeks before his death at 87½, look alike in the kind of beard, collar, necktie, and coat he wore. His likeness appearing on the obverse face of a medal struck tentatively for the Association in 1875 is similar to the picture here shown, but in complete profile. The original plan of issuing this medal in quantity for distribution to delegates, members and prospective members of the Association came to naught; hence, replicas of the medal are very rare (cf. Danforth, 1907).

[1] Isaac Newton Danforth. The Life of Nathan Smith Davis, 1817–1904. Chicago: The Cleveland Press, 1907.

[2] The writer has assembled a list of about 190 titles of the publications of Nathan Smith Davis, not including his numerous editorials. The task was a laborious one, for the literature which appeared in some of the older medical periodicals has not been classified or catalogued in the bibliographic indices. Though in consequence the list is probably not complete, it may be considered as representing fairly the writings of Davis. It would, of course, not be feasible to append this list here; instead two copies have been deposited: one in the offices of the Association of American Medical Colleges (2530 Ridge Ave., Evanston, Illinois), and the other in the John Crerar Library in Chicago.

ing the needs of the times, even as did most of his own writings, editorials, and public speeches, the present essay likewise can hardly do more than re-illumine, especially for today's generation, his imprint on medical teaching.

Throughout his long career Davis ever remained, in the real and original meaning of the term, a "doctor"—i.e., a teacher (*docere*, to teach). To educate both the individual and human society appeared to be his prime motivation as physician among his patients; as activator of the American Medical Association; as reformer of the curriculum; as founder of a great medical school and hospital; as citizen, benefactor, or sanitary engineer; as organizer of scientific and historical societies; as orator and debator; author and editor; and as lecturer in the basic sciences, in clinical wards, or in the halls of law; as leader in the Temperance movement or as Sunday-school teacher. Honestly, untiringly, and with no show of egotism he did his part by word and act to meet the challenge already voiced by Seneca 2,000 years ago: the first need is of great teachers. Like Plato, he knew, too, that education is a lifelong business, and he gave substance to the saying that the history of the world can be told in the history of its teachers.

The activities and accomplishments of Davis just enumerated in part indicate not only his prodigious energy but his many-sided personality. Like the obverse sides of a coin, each facet of his character had its contrast. Despite the complexity of his mind, his approach to problems was simple and straightforward. Under an austere and forbidding exterior and an abrupt and crisp manner—his patients were afraid in their first contacts with him—hid "a great tender heart," and no one knows how many homes found succor from his own purse besides his ministrations. An uncompromising individualist, he yet was foremost in cooperation, communication, and the furtherance of collective action. Though ultra-conservative in his personal habits and attire, he was a radical, rebelling against the prevailing measures of learning, teaching, and serving humanity. A stalwart Christian, he was given to outbursts of invectives, and "in the matter of meekness he was no rival of Moses, and he never tried to rob Job of his preeminence as the patientest man"; to an opponent, equally imperious, he could remain unrelenting and unforgiving. Though never a visionary, he possessed the long-range vision, supported by firm common sense and a positive self-confidence in the soundness of his plans. If he was of iron will and unyielding determination, he could exert forbearance and hence was an effective parliamentarian. Usually sternly taciturn, except when on the rostrum, he was then an eloquent and accomplished extemporaneous speaker, with a fine command of language and a resonant voice, who easily swayed his audience; though his oratory was not florid, he was all the more persuasive because of his sincerity and fearlessness and the logic of his statements, seasoned when he saw fit with a scathing sarcasm that wilted his adversaries. Finally, his busy practice and his success as a clinician and consultant were no inducement to accumulate riches.

When we seek clues for the influences that shaped these qualities of his mind and behavior, we are uncertain whether heredity or the circumstances of his childhood and youth were the more potent. It is likely that the ancestors were of Puritan stock, with their "rigid solemnity of the Sabbath." Somehow the cobbler's craft, an occupation that is conducive to cogitation, as many historical examples show, had a hand in his destiny. It is reported that his father when an apprentice to a shoemaker defiantly ran away from home in Massachusetts. He earned his way to the central region of New York State, which then was still a frontier demanding the hardihood of pioneers, there acquired a tract of land near Greene in Chenango County, and settled down to clear it and to farm. Here, in a gloomy and cramped log cabin, surrounded by woods, the son Nathan, the youngest of a family of seven children, was born (1817), and here he spent his formative years amidst hard work.

In his seventh year he was called to the bedside of his dying mother who "wished me to be a good boy," as Davis said many years later, "to learn to worship God, and to do good to my fellowmen," which he promised, not knowing then its full import. His primary schooling was sketchy, consisting of attendance at the district school, where the rod was the conspicuous emblem of authority and discipline. His fondness for study and passion for knowledge convinced the father that he had not the bent of a farmer, and with the scant means available he was sent at 16 for a term of 6 months to Cazenovia Seminary, located in the adjoining county to the north. There his zeal for higher learning received added impetus and also caused him to join the religious denomination controlling the institution, namely, the Methodist Church, to which faith he adhered devoutly to the end of his life. In the following year (1834) he commenced his training in medicine under Dr. Daniel Clark, a practitioner in Chenango County, who had recognized his ability and encouraged the choice of the profession that coincided with his promise to do good. In the same year he enrolled at the College of Physicians and Surgeons of the Western District of New York at Fairfield, a small village in Herkimer County. Its circular for 1830[3] tells us that:

> The College is within 8 miles of the Great Rail-Road from Albany to Utica; and any Medical Student, who is deterred from coming to the Institution by the dread of riding over 8 miles of a country road, had better choose some other profession than that of medicine. It is true, that the village has only one tavern, and no theatre, except the anatomical, and not a single grocery licensed to sell ardent spirits, but it has three churches, a moral population and good boarding houses. It is to be hoped that parents will think these advantages sufficient to counter-balance the want of incentives to idleness and dissipation.

[3] Lucius H. Zeuch (Editor). History of Medical Practice in Illinois, Preceding 1850, Vol. I. Issued by the Illinois State Medical Society, in Commemoration of its Diamond Jubilee. Chicago: The Book Press, Inc., 1927.

Thus, the prospective disciples of Esculapius were assured of their safe-keeping and their fathers and mothers reassured; but none, it may be assumed, were aware of a far greater inducement of the Fairfield College, namely, a reputation that would rank it among the most celebrated country medical schools in America.

Because its repute is pertinent to our theme, we should touch briefly upon its history. The county was populated mainly by Germans from the Palatinate who played an important role in this section of New York State—witness, for example, the stand of General Herkimer and his compatriots at Oriskany in the American Revolution. After the war there was a considerable influx of New Englanders, among them the 23-year-old Dr. Westel Willoughby, Jr., who came from Connecticut. He soon won the respect of the community, for in 1803 when Fairfield Academy was established his name appears among the board of trustees. In succeeding years he formed the Herkimer County Medical Society, helped to found the New York State Medical Society, and was elected to the State Assembly. In 1809, during his second term at Albany, he was instrumental, it seems, in securing a small appropriation for the medical school which had been organized in that same year in connection with Fairfield Academy. From then until 1840, when the medical school closed its doors, it was notable for its distinguished faculty, composed of men who "thought less of borrowing character from their stations than of making it for the institution." Almost all who taught there occupy a high place in the annals of American medical history. One of them was T. Romeyn Beck, whose lectures on medical jurisprudence fascinated the young Davis and planted in him a perpetual interest in this subject, so that even late in life he is found giving instruction in it to the law students at Northwestern University. The faculty, not the course of study, lent distinction to the Fairfield Medical School, since the order of learning was the customary one of those times: attendance for several terms, each 3 or 4 months long, and

hearing the same set of lectures in the different courses as many times over, these being presented without any heed to sequence of prerequisites—a plan of pedagogy that appeared incongruous to Davis already then and rendered his mind fit to turn later to its antithesis, the "graded curriculum."

Many of the graduates of the Fairfield Medical School became more eminent than was its faculty. Among the most illustrious examples we find no less than the famous botanist Asa Gray, who received his medical degree there in 1831. It is a curious coincidence that all the creators or chief organizers of the pioneer medical colleges in Illinois hailed from the Fairfield institution. In 1842 George W. Richards founded Franklin Medical School at St. Charles in that state; in the following year, David Prince was the principal power behind Samuel Adams in establishing at Illinois College in Jacksonville a medical department that became outstanding, though existing only a few years; also in 1843, Daniel Brainard opened Rush Medical College in Chicago, and 16 years later Nathan Smith Davis, with the aid of several associates, originated the school that subsequently was to become an integral part of Northwestern University. The school at St. Charles was ill-fated almost from the start, because an episode in consequence of a "grave-robbing" for Anatomy led to a notorious riot of indignant citizens in which Dr. Richards was permanently crippled by a bullet and one of his students was shot to death.[4] In Dr. Richards's faculty was the renowned John Delamater, the most scholarly and inspiring teacher at Fairfield for 13 years, of whom it has been said that perhaps no single teacher of his time, with the possible exception of Daniel Drake, exerted so wide an influence on medical education.

Davis, at 20, graduated from Fairfield Medical School in January, 1837, with honors; his doctor's dissertation, on "Animal Temperature," was chosen, because of its excellence, to be read publicly at the graduation ceremonies. Shortly before, he had resumed his medical apprenticeship by entering the office of Dr. Thomas Jackson of Binghamton in Broome County from whom he learned much clinically. He then set out to practice in Oneida County. There he met and married Judge John Parker's daughter, Anna Maria, beginning a union that lasted harmoniously until his death 66 years later, and that was the beginning, too, of a "dynasty" which thus far has extended over four generations. In the following year (1838) he removed to Binghamton, where he was to stay for 10 years. This was a period of intense intellectual activity; besides tending his practice and keeping up with the current medical literature, he made dissections both in human and comparative anatomy, studied Latin, botany, chemistry, geology, and political economy, in all of which he became proficient; and he frequently responded to requests to lecture on these and allied topics before the classes of Binghamton Academy, of which, it is stated,[5] he was the founder; he formed a debating club there and assisted in editing a local popular periodical; he won prizes from the New York State Medical Society for the best-written medical essays, and when the State Legislature recommended the study of agriculture in the common schools he wrote a textbook to fill the need. Also, he soon had a prominent place in the affairs of the Broome County Medical Society as its secretary and librarian. In 1844, Davis—then 27—was elected delegate to the annual meeting of the state medical society. He took an active part in its deliberations, and when he rose to speak his hearers listened with deference and undivided attention. His reputation had preceded him, proving the validity of William James's advice:

> Let no youth have any anxiety about the upshot of his education, whatever the line of it may

[4] Otto F. Kampmeier. History of the Anatomy Laws in Illinois during the 19th Century, Chap. XIX, pp. 361–402. *In:* History of Medical Practice in Illinois, 1850–1900, Vol. II. Issued by the Illinois State Medical Society. Chicago: Lakeside Press, 1955.

[5] Morris Fishbein. A History of the American Medical Association, 1847 to 1947. (With the biographies of the Presidents of the Association, by Walter L. Bierring.) Philadelphia: W. B. Saunders Co., 1947.

be. If he keeps faithfully busy each hour of the working day, he may safely leave the final result to itself. He can with perfect certainty count on waking up some fine morning to find himself one of the competent ones of his generation, in whatever pursuit he may have singled out.

That ideas are seldom new—that they are merely refurbished old ones, offered or acclaimed as if new—is commonly overlooked in discussions on education. Arbitrarily selecting a point in time, we can say that, ever since the day in May, 1765, when John Morgan at the College of Philadelphia delivered his discourse "Upon the Institution of the Medical Schools in America,"[6] in which he analyzed with a penetrating eye the criteria of medical training and of preliminary schooling in the humanities, literature, and science, and focused on the essentials (all of this fundamentally similar to our present-day disputations on what is needed), the subject of medical education has been of perennial interest whenever and wherever doctors gather. The thinking about medical education constantly simmers, until, once in every 50 years—let us say, in every generation—it boils over in a concerted but faltering action, never quite reaching the practical objectives, let alone the ideal. So it was then, so it was after the Revolution, so it was in the middle of the past century when Davis was a young man, so it was at the turn of our century, and so it is now when medical education is again in turbulent ferment. Chance and circumstance more than the vigor with which the proponent of a constructive idea presses for its acceptance determine the time of its adoption. Sometimes we ought to be reminded that the history of knowledge is replete with instances of great scholars—Darwin and Mendel may be cited as illustrations—who attained greatness because of original observations and formulated principles, though essentially the same discoveries had been offered by other scholars to the world before but, happening not to fall into receptive minds, had passed unnoticed and become lost. The content and temper of a culture, their impact on the individual mind, and its reactions to them being mutually interdependent or reciprocal, any claims of priority in the promulgation of an idea and its realization would therefore seem to be presumptious. Such did not disturb the learned men of the Middle Ages; but from the Renaissance onward—when freedom and individualism emerged more sharply drawn in the Western world and the obsessional craving to work, the striving for achievement, recognition and prestige, and the ambition for fame were among the dynamic factors of its civilization—there is no escape from the considerations of priority. However, because of the unbroken continuity of ideas in all lines of knowledge, it is rarely possible to decide, in the balance of values, whether the credit should go to those men who saw the vision but could not hasten the time of ripening or to those who brought things about.

Agitation for the reform of American medical education in the direction of a "graded curriculum," substantially resembling that of today, began no less than 125 years ago and more than a decade before Nathan Smith Davis launched a vigorous campaign in its behalf. As early as 1827 delegates from medical societies in New York and New England met in Northhampton, Massachusetts, and passed resolutions designed to improve educational standards.[7] In 1831 Daniel Drake wrote his "Practical Essays on Medical Education and the Medical Profession in the United States"[8] in which he outlined a course of study that placed the basic sciences in its first part and the applied or clinical subjects in the second. He proposed a resolution advising such a division which was adopted by the Medical

[6] John Morgan. A Discourse upon The Institution of Medical Schools in America. Delivered at a Public Anniversary Commencement held in the College of Philadelphia, May 30 and 31, 1765. Printed by William Bradford at the Corner of Market and Front Streets, Philadelphia, 1765.

[7] William F. Norwood. American Medical Education from the Revolutionary War to the Civil War. J. M. Educ., **32**:433–48, 1957.

[8] Daniel Drake. Practical Essays on Medical Education and the Medical Profession in the United States. Western J. M. & Physical Sciences, **5**:11–12, Cincinnati, 1831.

Convention of Ohio in 1838. In February, 1835, Dr. Edward Cutbush in an oration,[9] at the inauguration of the Medical Institution of Geneva College, said:

> If I possessed the power, no man should be permitted to enter on the exercise of his profession who has not been engaged in studying the various branches at least five years; and even after that period the life of a conscientious practitioner should be a life of study, research and reflection.

He recommended for medical students not only a reading knowledge of French and German but a classical education as well, which implied an academic degree—so that the ancient as well as the modern medical literature can be followed, since, said he: "Cast your eye over the old worm-eaten authorities and you will often be astonished to find many modern opinions in an old-fashioned dress." In the same year (1835) Dr. Reynell Coates in a speech on the "Defects in the Present System of Medical Instruction"[10] before the Philadelphia Medical Society proposed a proper order of succession in the principal branches of a full course in medicine. Medical education was the leading topic of discussion again at the session of the New York State Medical Society in 1839. Five years later when Alexander Thompson of Cayuga County and the 27-year-old Nathan Smith Davis of Broome County presented resolutions before the same body advocating the lengthening of the college term, the introduction of a graded curriculum, and the elevation of the general education preliminary to the study of medicine, the resolutions failed of approval but were deferred for reconsideration at the next annual meeting.

The objections put forth cannot be dismissed glibly by fixing the blame on the familiar inertia to change, for there was much to be said in favor of the arguments that the country had not fared badly with the kind of practitioners prepared by the mode of training then in vogue. In truth, when we look back to Ephraim McDowell, William Beaumont, Daniel Drake, Nathan Smith Davis, and many another brilliant American medical man of that day, all of them the product of the old preceptorial system combined with an antiquated curriculum at school, we see some justification in the skepticism toward a novel and untried scheme. However, such men will soar high, despite low-level or adverse teaching, and they illustrate the discernment of Paracelsus, who spoke thus in the words of Robert Browning:

> Truth is within ourselves; it takes no rise
> From outward things, whate'er you may believe.
> There is an inmost centre in us all,
> Where truth abides in fulness; . . . . . .
> . . . . . and to KNOW
> Rather consists in opening out a way
> Whence the imprisoned splendor may escape,
> Than in effecting entry for a light
> Supposed to be without.

On the other hand, for the multitude of practitioners of more modest talent or average professional aptitude, competence is measured by the kind of instruction and discipline to which they have been exposed, because, as Osler remarked, though in another context: "System is the harness without which only the horses of genius may travel."

The most cogent objection of the New York State Medical Society to the resolutions for revision of the curriculum was a practical and ulterior one, since, when in 1845 Davis again zealously urged their adoption, it was pointed out that any lengthening and stiffening of the course of study in the medical schools of the state would drive students to the schools in neighboring states. Thereupon, Professor Alden March of Albany suggested that the proposition be modified to embrace all the medical schools in the land. Davis immediately complied and reworded his resolution accordingly. It was the germ from which sprang the American Medical Association.

[9] Harvey Cushing. The Pioneer Medical Schools of Central New York. An address at the Centenary Celebration of the College of Medicine of Syracuse University, June 4, 1934.

[10] Reynell Coates. Oration on the Defects in the Present System of Medical Instruction in the United States. Read before the Philadelphia Medical Society, November 21, 1835.

This body, too, had its antecedents; it did not rise "full-blown from the brow of Zeus."

Of the innumerable "grave-robbings" that occurred before the middle of the past century to supply the anatomists with dissection material, none had more memorable consequences for the promotion of medical education in the United States than the one that took place in a country churchyard near Ipswich, Massachusetts, in a snowstorm on the night of January 10, 1818.[11] The gleam of a lantern had been seen there shortly after the burial of a young woman. Other signs aroused the suspicions of the parishioners, who then opened the grave and found it empty, as were also seven other graves of persons who had died that fall or winter. Thomas Sewall, a local doctor who was teaching surgery to a group of students at the time, was arrested when identifiable parts of bodies of the deceased were discovered on his premises. He was tried and convicted—though defended by an eloquent attorney, Daniel Webster—to pay a fine of $800. Knowing that Dr. Sewall's practice at Ipswich was ruined, Mr. Webster, then a member of Congress, invited him to start anew in Washington, D.C. There Sewall soon rose to national prominence for founding (1825) the capital's first medical school (National Medical College, Medical Department of Columbian College, now George Washington University), where he functioned first as its professor of anatomy and physiology, then of medicine, also as dean.[12] He became the personal physician of three presidents of the United States. Early (1825), too, he wrote a comprehensive treatise on medical education, the first since John Morgan made his famous address. Sewall advocated a national medical organization. He died in 1845, at the age of 49, a year or two before the American Medical Association actually came into being.

[11] Frederick C. Waite. An Episode in Massachusetts in 1818 Related to the Teaching of Anatomy. New England J. Med., 220:221-27, 1939.

[12] Thomas Sewall. A Lecture Delivered at the Opening of the Medical Department of Columbian College in the District of Columbia, March 30, 1825. Washington Columbian Office, 1825.

The Medical College of Georgia in 1835 "formally proposed the holding of a convention of delegates from the medical colleges of the Union." However, the schools were either opposed to the proposal or were indifferent or apathetic to it. Four years later (1839), at the annual meeting of the New York State Medical Society, Dr. John McCall of Utica, upon reading this preamble: "Whereas, a National Medical Convention would advance . . . the cause of affording an interchange of views and sentiments on the most interesting of all subjects —that involving men's health and the means of securing or recovering the same. . . ." offered a plan of such an organization to be initiated at a meeting of delegates—three from each state medical society and one from each duly authorized medical school in the United States. His recommendation was approved by the Society, and all the necessary steps, such as circularizing the aforesaid bodies, inviting their delegates, and designating the place and date of meeting in the following year, were taken to carry them into effect; but at the appointed time no delegates appeared, not even those from Philadelphia, where the proposed convention was to be held.

Fully aware of these failures, Davis was determined to succeed in his venture, when in 1845 he submitted his previously mentioned resolve—modified by Dr. March of Albany—calling for a properly constituted national convention with the primary aim of raising the standards of medical education and licensure. Although many members of the New York State Medical Society regarded his design as utopian and impracticable, the vote was carried by a large majority, and he was chosen chairman of a small committee to implement it. He at once entered upon a laborious correspondence—*sans* stenographer, typewriter, mimeograph, or other secretarial aids—with medical societies and colleges throughout the nation. His strenuous labor was rewarded, for in the next year (1846) at least 100 delegates from various states gathered at the specified time and place in New York City to discuss the

foremost topics at issue and to appoint able committees to arrange further action. At the same meeting, Davis, as chairman of the main committee, proposed the establishment of a National Medical Association that would serve its members to facilitate the attainment of their common objectives, protect their interest, maintain their honor and respectability, advance their knowledge, and extend their usefulness. Besides winning assent, he secured sanction for the appointment of committees to report a plan of organization for such an association at a meeting to be held at Philadelphia in the following year, and to address and invite delegates accordingly. On May 5, 1847, these representatives assembled in the hall of the Academy of Natural Sciences in that city, weighed and ratified the submitted articles that set into motion the American Medical Association. Besides the 250 delegates, some of the most noted men in the profession were on hand to extend their felicitations. Thus, Davis at the age of 30 had brought about the greatest achievement of his career, and it is not surprising that no enterprise so captivated and held his thoughts as did this institution. From 1847 to half a century later he missed but four of its annual sessions, and he was always a power in its affairs, whether as president, nestor, parliamentarian, debater, first editor of its journal, codifier of its ethics, battler against charlatanism, or spur to clinical and scientific investigations. Often domineering and impetuous, he yet could bridle his impatience with restraint and thus affirm the counsel of Thomas Jefferson:

> I know no safe depository of the ultimate powers of society but the people themselves. And if we think them not enlightened enough to exercise their control with a wholesome discretion, the remedy is not to take it from them, but to inform their discretion with education.

Having reached the pinnacle of accomplishment, the further course of Davis's life might have seemed an anticlimax, when in reality the ascent was only the proving ground of his capabilities as an educator and organizer. In the same year in which the American Medical Association became a reality, he removed to New York City, believing that there he could expand his clinical experience and scientific knowledge and become connected with a medical periodical. Several months later he was appointed demonstrator of Anatomy and was placed in charge of the dissection laboratory at the New York College of Physicians and Surgeons and also, by special invitation of its faculty, delivered lectures on Medical Jurisprudence. He became assistant editor of the semi-monthly medical journal *The Annalist* and in the following year its editor and publisher, thereby developing his skill and mastery for the guiding and editing of other medical journals—altogether eight—during various periods of his life. Already then he was a staunch adherent of the principle of the indivisibility of medical art and science. He was ever contemptuous of specialization, and we believe he would have applauded George Bernard Shaw's witticism "no man can be a pure specialist without being in the strict sense an idiot." Certainly he would have subscribed without reservation to the judgment of Alfred N. Whitehead, who, after speaking of the unavoidable fragmentation of science because of the limitations of human ability, points to the dangers of increasing departmentalization of universities, however necessary for administrative purposes, since such departmentalization "tends to trivialize the mentality of the teaching profession." The concept of the unity of knowledge which was typical of the minds of the Renaissance, when a man could be both scientist and humanist, versed in many things, was carried over into the 19th century; for when we peruse the annual bulletins of medical colleges in this country of 100 years ago we are amazed how common was the custom of rotation of teachers among various departments from year to year—a procedure almost inconceivable today because of the extreme refinement of methods and the staggering aggregate of facts and theories in each branch of medicine. What those teachers may have lacked in depth of knowledge they gained in breadth, and they could not lose sight of the

human being as a whole and integrated organism. With advancing years, Davis became acutely conscious, especially as an editor, of the accelerating pace of publication of scientific literature. Critical of much of it as representing hastily formed conclusions or rules of practice based on insufficient data, he stressed that the quality of the literary output could be improved and its quantity assimilated through the medium of diligent attendance and interchange of ideas at municipal, county, state, national, and international medical associations which would effectually block the drift towards specialization. He looked upon the family doctor as the highest type of medical practitioner and believed that the specialities in medicine were harmful alike to physician and patient.

The avalanche of specialized knowledge is descending upon us at an ever quickening tempo, however, so that today, as a recent writer has reckoned, scientific papers of approved value are published in recognized periodicals throughout the world at a rate of 50 every 15 minutes. How to apprehend and control the implied splintering of learning, research, and practice, and the consequent isolation of their workers from one another, without sacrificing the benefits of the division and diversification of labor is still awaiting a satisfactory answer. Already in 1887, in his presidential address before the 9th International Medical Congress, Davis—after saying that "the most embarrassing feature in the science and art of medicine is the rapid accumulation of facts by vast numbers of individual workers, each pushing investigations in some special direction without concert with his fellows and without any adequate conception of the coincident lines of observation necessary to enable him to see the true bearing of the facts he evolves"—emphasized the need of associated action in solving many medical problems. Now, 70 years later, such philosophy is finding partial fulfillment in the methods of group practice, group research, and group teaching. How to select from the bewildering mass of minutiae the essentials, how to synthetize them into a composite body of knowledge for the purpose of remodeling or reorientating our curricula so as to educate today's medical students adequately, both culturally and professionally, remain still in turmoil. The various experiments in different universities and medical schools throughout the land, their attempts to overcome the dichotomy between the liberal, cultural, and scholarly and the professional, vocational, and practical education; to integrate the premedical and the preclinical disciplines even of their basic concepts and generalizations; to humanize the teaching programs; to stress comprehensive medicine with the inclusion of a greater share of the social and behavioral sciences; to correlate more intimately the branches in the medical curriculum itself; to train the student in fundamental principles and in sound habits of thinking, rather than in the storage of facts, so that he can coordinate the proffered knowledge himself and acquire the methods for continued self-education; to revive and renovate the preceptorial system; to recognize the changing foundations of medicine and revamp the curriculum compatibly with the introduction of more genetics, physics, chemistry, psychology, anthropology, experimental and statistical methods, and so forth (not to mention sundry other variations on the theme)—all these experiments are evidence of our perplexity and our groping to resolve it. It is to be hoped that these diverse, critical experiments will not later crystallize into a stereotyped pattern of uniformity and inflexibility, as exists in the present, rigid undergraduate medical program whereby a student is virtually compelled to remain at the same school from the time of his matriculation until his graduation. Much can be said in favor of the traditional academic freedom of choice in continental Europe permitting the student to migrate from university to university, spending some semesters here and some there, as he seeks to sit at the feet of different professors honored for their learning, teaching, and attainments in their particular fields. With the presence of diversified cur-

ricular dispositions in our nation, a student of quality would likewise derive benefit from the widening of his horizons if he could experience several academic environments during his undergraduate days.

In the spring of 1849 Davis was invited to accept the chair of physiology and general pathology at Rush Medical College in Chicago. Preoccupied with reforms in medical teaching, he doubtlessly believed that he could bring them about more easily in this young and vigorous pioneer college than in the older institutions in the East. Daniel Brainard was known for his vision, his progressive outlook, and his energy and efficiency as an administrator whose chief goal was the building up and ascendancy of the school which he had planned and for which he had secured a charter from the State of Illinois as early as 1837, but which, for lack of means, did not have its inception until 6 years later. It is unlikely that another community of interest between Brainard and Davis inclined the latter toward accepting the offered post; both were ardent and active democrats politically, and Brainard for a time had served as the editor of the newspaper *The Chicago Democrat*. In the autumn of 1849, Davis arrived in Chicago—then a town of 23,000 people, but still frontier, with its unsanitary conditions and unpaved streets of "no bottom" in wet weather—to take up his teaching duties at Rush Medical College. He, then 32 years old, soon found that he could not work in full accord with his colleague, 5-years older, despite the similarity of their endeavors and capabilities. Both were headstrong in their opinions, and there occurred the inevitable clash of personalities. Neither one showed a tendency toward conciliation, and the rift once made became permanent. In 1852 Brainard went to Europe to receive the honorary membership of the Societé de Chirurgie de Paris, also that of the medical society of the Canton of Geneva; at the same time he obtained a valuable osteological collection for the teaching museum of Rush Medical College. The story goes that, during Brainard's absence, the annual college bulletin was made ready for the printer, in which a graded course, extended terms of study, and other relatively radical pedagogic amendments were announced, but just before the fated document was sent to press, Dr. Brainard appeared on the scene and vetoed the plan.

Consequently, Davis was destined to bide his time longer. However, his departmental autonomy remained undisturbed, there being no interference with his teaching methods. He was a born teacher, clear in his thinking, terse and incisive of speech, and advanced in his methods. In Ludvig Hektoen's review (1937) of early pathology in Chicago,[13] in which Nathan Smith Davis is recognized as the first to fill this chair in the city, the belief is expressed that he brought a microscope and was the first to use such a device in the classroom. It is hard to apprehend that only 100 years ago the microscope had not yet come into common use in biological investigation and instruction in this country. Although the instrument came to America early,[14] for Dr. Cotton Mather owned and used one in 1685 and Harvard College in 1732 received from Thomas Holles, of London, the gift of a "screw-barrel" compound microscope (a Culpepper-Wilson) with a hint that it was time for the college to use it,[15] American anatomists (more correctly speaking, surgeons and other clinicians who taught anatomy) contributed almost nothing to the early development of histology, cytology, and embryology, fields which had been cultivated so assiduously by European, especially German, anatomists since the middle of the 19th century. On the whole, until the sixth decade in the United States the microscope remained "a pretty toy rather than an aid to scientific discovery."[16] The one which Oliver Wendell

[13] Ludvig Hektoen. Early Pathology in Chicago. Proc. Inst. Med. of Chicago, 11:258, 1937.

[14] Frederic T. Lewis. The Advent of Microscopes in America, with Notes on their Earlier History. Scientific Monthly, LVII:249–59, 1943.

[15] Frederic T. Lewis. The Hollises and Harvard. Harvard Graduate Magazine, pp. 109–10, 1933.

[16] Charles Russell Bardeen. Anatomy in America. Bull. Univ. Wisconsin Science Series, 3:85–208, 1905.

Holmes brought home from Europe, after his study in Paris (1833–35), entranced him, because "he had a great taste for everything ingenious, and playing with this machine devoured many an hour." The *Announcement and Catalogue of Rush Medical College* for the summer of 1845 tells of its microscope—perhaps procured by Daniel Brainard on his first journey to Europe in 1839—to display the elementary tissues. Some years later the annual circulars of various medical schools point with pride to the possession of a microscope, though there is little evidence of its actual use. Not until the 1860's and 70's are courses of special instruction announced employing the microscope for purposes of demonstration. Dr. J. M. DaCosta in Philadelphia had quickened this trend by his translation (in 1860) of von Kölliker's *Mikroskopische Anatomie*. Prior to that time whatever attention was given to histology was taught in connection with pathology. It does not surprise us, therefore, to find Nathan Smith Davis in the forefront of those who in America first used the microscope in research and teaching.

With the same intensity of aim as shown in the laboratory, he advised the citizens of Chicago how to prevent the contamination of their wells from surface drainage by installing a sewage system and how to get an excellent water supply from Lake Michigan. Characteristically he combined these projects with the procurement of another health facility which was lacking in the city, namely, a public hospital. For his series of public lectures on sanitation a small admission fee was charged, and with these proceeds—amounting, it is said, to $100—he began a little twelve-bed hospital that eventually grew into the great Mercy Hospital of Chicago.

In 1859 Davis and a few like-minded colleagues seceded from the Rush College faculty to create the medical department of the newly founded Lind University in Chicago. Several years later when this institution collapsed because of financial difficulties incident to the stress of the Civil War, its medical division was reorganized (1864) as an independent school, the Chicago Medical College, with Davis as its president. Supported by able and loyal co-workers he now had the opportunity of embodying his cherished theories of medical education; he required entrance examinations, instituted an orderly plan of instruction, conditioned the advancement of the student from the lower to the higher classes upon stated examinations, and later prolonged the course of study and training. The misconception, widely held, that Davis was the first to put into operation the "graded curriculum" has been corrected by the late Professor Frederick Waite who has detailed the actual sequence of events concerning the introduction of the modern medical course in the United States.[17] As early as 1854 the short-lived, eclectic Penn Medical University in Philadelphia and, in the next year, the St. Louis College of Medical and Natural Sciences introduced "a progressive" (that is, a graded) "system of medical education." In the catalogue of the Medical School of Harvard University for 1858 a 3-year course is recommended to the students, with the basic sciences and the clinical disciplines following each other in logical steps. All such progressive curricula of a century ago, which impress us because of their structure, still modern until most recently, were at first optional. Before 1880 an obligatory graded course of three sessions had been devised and instituted by only ten American medical colleges, of which Harvard Medical School (1871–72), under Charles W. Eliot, and Chicago Medical College (1874–75), under Nathan Smith Davis, head the list. Not until 1891, when the National Confederation of State Medical Examining and Licensing Boards demanded a minimum of 3 years of medical training, and when almost simultaneously the Association of American Medical Colleges was reactivated and reorganized[18]—with Nathan Smith Davis as its

[17] Frederick C. Waite. Advent of the Graded Curriculum in American Medical Colleges. J. Assoc. Am. Med. Colleges, 1950.

[18] Dean F. Smiley. History of the Association of American Medical Colleges. J. M. Educ., 32:433–48, 1957.

president from 1891 to 1894—did stronger bonds of unity among these institutions lead to agreement in the requisites of higher standards. Coincidently, a few medical schools, among them that of Northwestern University, took the lead in requiring a graded curriculum of four sessions. Then, too, the influence of Johns Hopkins University,[19] beginning in 1876 and modeled on the concepts, scholarly attitudes, and enthusiasms of the German universities of those times, had become manifest throughout the land; the graduates of its School of Medicine, who had imbibed the precepts of its distinguished professors, carried the lamp of research and scholarship far and wide, as many of them became teachers, tillers, and leaders in medical schools elsewhere. The soil of the garden of medical education so readied and the good seeds sown, the censorious Flexner report[20] coming a decade or so later was to be the sharp hoe to cut down the weeds, tares, and thistles and clear the ground for a healthy growth.

The conviction that the science and art of medicine could flourish only in the stimulating atmosphere and cultural environment of the university, and come to full fruition upon its high ground of outlook and ideals of scholarship, imbued the mind of Davis early. Indeed, as he well knew from the example of the Salernitan traditions, Medicine was the seed from which the European universities had grown. In 1851 Davis—let us recall that he was then only 34 in age—was elected a member of the first board of trustees of Northwestern University. He held the post the remainder of his life. Being never a passive participant he, we can be sure, not only consummated the fusion of the Chicago Medical College with Northwestern University in 1891 but had a hand in shaping the educational policies of the university itself. In this light the epigram that "an institution is the lengthened shadow of a man" is apt.

During a span of 45 years, from the founding of the Chicago Medical College until his death, Davis held the professorship of the Practice of Medicine, besides serving as the dean of the faculty and lecturing on Medical Jurisprudence. He also gave a course on the History of Medicine, for he maintained that without a knowledge of the development and growth of his profession a man's education is deficient and his judgment of values fragmentary and insecure. All these academic duties, which would have taxed the strength of any one of his staff members, were but a part of his daily cycle of work; he gave unstintingly of time and energy to his large private practice, to his position as chief physician at Mercy Hospital, to his leadership in medical organizations, to civic interests, and still managed—by getting up at 6 o'clock in winter and earlier in summer—to set aside 2 hours every morning for his writing.

The list of his publications—not including his numerous editorials—is a formidable one, consisting of more than 175 titles and ranging almost over the entire domain of medicine. All the titles are peculiarly synoptic, that is, long, embracing, and explicit, leaving no doubt in the mind of the bibliographer concerning the nature and content of the subject matter discussed. In view of the physical as well as mental exertion which his writings represent, for he employed no private secretary or typewriter and he wrote slowly though methodically, all of it interposed among his other intensive labors, we grasp how oaken must have been his constitution. His stamina—the combined product of heredity, of training in endurance during youth, of an abstemious mode of living, and of his usually calm, judicious, and orderly habit of doing things—was amazing. In 1886, at the age of 69, he was stricken with an attack of cerebral hemorrhage, resulting in a nearly complete right hemiplegia, from which he unexpectedly recovered in a few weeks, to resume in full his activities which lasted during the remaining eighteen years of his life.

[19] Richard H. Shryock. The Influence of the Johns Hopkins University on American Medical Education. J. M. Educ., 31:226–35, 1956.

[20] Abraham Flexner. Medical Education in the United States and Canada. Carnegie Foundation, Bull. No. 4, New York, 1910.

Among his publications there is no single topic that recurs more frequently than alcohol. It interested him throughout his entire career, and it dominated him in his declining years. His main thesis was simply that the consumption of spiritous liquors was deleterious to health and that they had no worth whatsoever as therapeutic agents in disease. Anecdotes could be cited to epitomize his doctrines in this matter. Unremittingly he hammered away at it to his patients, at medical meetings, in lectures to the laity, and in his writings, and he became the most outspoken and influential leader in the cause of temperance in America, both in the prevention of inebriety and in the rehabilitation of the inebriate. We can imagine his inner indignation when he saw some of his fellow members at the meetings of the American Medical Association exhibiting by their behavior the effects of indulgence in the beverages so vehemently condemned by him. At its session of 1891 in Washington, D.C., he gathered the physicians, interested in the promotion of temperance, for the purpose of forming the American Medical Temperance Society. As its founder and first president, he gave to its organization the same concentration of effort as he had expended in contriving the American Medical Association.

During the last 3 years of his life, he allotted the usual time to his practice. On Saturday, June 4, 1904, after he had attended his patients at his office and had walked home to his residence (291 Huron Street, Chicago), he was seized with a short period of angina pectoris. On the following Thursday, another heart attack immediately preceded his death, at the age of 87½ years. So passed a great, learned, and humane physician and a dedicated teacher who was in every sense an exemplar of the spirit of labor, character and virtues, and wisdom and ethics of Hippocrates.

Relating Man to His Environment for the Freshman Medical Student*

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Recently, there has been an increasing recognition of the fact that the physician should be a broadly educated individual, not only well grounded in the techniques and skills of his profession but in the humanities as well, with a scholarly appreciation of the social problems of the day. In short, the virtues of a liberal education should be extended to the medical schools.

Such a goal is easier to express than to achieve, since there is no simple way to effect a change in the medical curriculum in any one school without long and careful deliberation. However, we at Maryland established 3 years ago a new course in the freshman year entitled "Man and His Environment." There were some dissenters at the time, both in and out of the school, who, while approving the idea in principle, expressed the opinion that educating the medical student culturally was not the responsibility of the medical schools, but of the colleges. The committee responsible for planning this course agrees with this criticism; however, the increasing specialization in premedical education is presenting us with students possessing a narrow cultural viewpoint, which the standard medical curriculum does little to improve. After proceeding on a trial and error basis for 3 years, we have clarified our thinking sufficiently to know what is possible and how to achieve it.

* Presented by title at 69th Annual Meeting, Association of American Medical Colleges, Philadelphia, 1958.

† Professor of Neurology and Head of Division of Neurology.

‡ Professor of Physiology and Associate Dean.

Perhaps this is best summed up by saying that our goal is to orient the freshman medical student in the society he will eventually enter as a medical practitioner. Our students come from diverse educational backgrounds, about one third from the colleges and universities of Maryland, others from some of the country's most venerable institutions, as well as from less well known colleges. We cannot assume that they have a uniform educational background, much less a uniform cultural background. With this in mind, we try to create an awareness of how certain problems in modern society are related to the practice of medicine; such problems as are presented by today's radiation hazards, the conquest of space, juvenile delinquency, population pressure, effect of disease on society, the effect of society on disease, the effect of environmental stresses and how far man can adapt to them, the nature of the universe, and many others.

The title of the course turned out to be a happy choice, since it is sufficiently broad to include almost anything that affects mankind and because man's environment now extends from the depth of the sea and the bowels of the earth to outer space. All the lecturers are guest lecturers and are from outside the medical school. At first we had a few of our own medical school faculty but discontinued this policy, since we believed that our students would ultimately absorb what they had to say during their 4 years with us and also because a distinguished visitor always arouses a certain amount of intellectual curiosity, especially if he enjoys a national reputation in scholarly circles. We

are most fortunate in being in an area where there is a high concentration of such talent.

Each lecturer speaks on his assigned subject, and there is, of course, no continuity between them, although the lecturer is given a briefing on what the course is all about and more or less where he fits into the general plan. Continuity of a sort, however, is achieved by careful planning plus experience regarding the content of the lecturer's talk. This latter is not always available, but as time goes on the panel of speakers increases, and more of a backlog of information accumulates.

TABLE 1

LECTURE SCHEDULE
1957–1958

MAN AND HIS ENVIRONMENT

1. Origin of the Universe
2. Nature of Particulate Matter
3. Biochemical Evolution
4. Physiological Evolution
5. Physical Anthropology
6. Cultural Anthropology
7. Physical Anthropology
8. Growth and Development
9. Experimental Embryology
10. Social Factors in Disease
11. Genetics
12. Genetics
13. Medicine of Prehistoric and Primitive Peoples
14. History of Psychiatry
15. History of Medicine in the United States
16. Influence of Disease on Civilization in the Past
17. Modern Disease Patterns
18. Physiological Problems of the Future
19. Population Pressures
20. Adaptation to Physiological Environment
21. Social Patterns of Disease
22. Philosophy of Science
23. Juvenile Delinquency
24. Content of Gerontology
25. Heredity and Disease
26. Adaptation to Social Environment
27. Communication
28. Behavior and Disease
29. Down from the Tree and up to the Moon

The format of the course is relatively simple and follows what we believe is a logical pattern of development. We begin with the beginning, the nature of matter and the evolution of the solar system, and proceed through biochemical and physiological evolution to man himself. Obviously, such a course cannot be complete. Actually, it amounts to a number of points of view of men whose opinion and thinking carry some weight.

The course meets on Saturday morning at 9:00, and the lecturer speaks for about an hour on his assigned subject, following which interval the period is thrown open for discussion for another hour. Students are encouraged to ask questions and to present their own views on the question. Originally, we thought that a special effort was necessary to relate the speaker's material with the problems of medical practice. For this reason, during the first year members of the faculty were called upon to open and to furnish the discussion following the lecture. It was soon apparent that the students achieved with their questions all the correlation necessary. As a rule, the questions come thick and fast, and an informal relaxed relationship between the speaker and his audience is quickly established. Most of the speakers profess to be delighted afterward with the student response and are enthusiastic about the course and its goal. Last year (1957–58), 30 meetings were held through the school year, and the schedule of lectures is shown in Table 1. Plans for 1958–59 are proceeding along the same lines.

Of necessity, the course presents no solutions. It simply tries to state the problem and place it in the framework of medical practice and research. Perhaps the emphasis is on the rapidly changing nature of our society. No doubt the eternal verities still stand, and human conduct is immutable. In the past, society was relatively stable, and the ground rules persisted from one generation to another. Even in such a social pattern men had their difficulties in adjusting to their environment and to one another. Today, one cannot assume that what is good enough for us will be good enough for our children. The problems of population pressures, an expanding economy, aging, shortages of natural resources, and the challenge of space are among the many which must be faced and whose implications understood. In

addition, there may be too great an emphasis on the social obligations of the physician. These obligations are becoming formalized to such an extent that many of our students today will never practice medicine on a fee-for-service basis but will be either public servants or salaried employees of industry or some other organized group in society. It is proper that the physician should discharge his social obligations, but great emphasis on this aspect of his duties carries with it the danger that the individual will be forgotten. It is the individual who suffers and is ill and with whom the physician must deal as long as he practices medicine. It is our hope that this course presents the individual man and his environment in the proper perspective. Certainly, we do not expect to create finished social philosophers in 30 lectures, but we do feel obligated to inform our students of some of the social-scientific-economic factors recognizable at the moment that they must deal with as future physicians.

The Cancer Achievement Testing Program

I. An Overview*

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History and purposes of the program.—The "Examination for Students of Medicine in the Subject Matter of Cancer"[1] was originally designed as an instrument for the evaluation of the teaching and learning of the subject matter of cancer at the University of California School of Medicine in 1948. Since 1949 the test has been administered annually, on a voluntary basis, to a majority of the medical schools in the United States. Similar programs have been conducted in the dental and osteopathic schools since 1950 and 1952, respectively. The evaluation program has been conducted by the Education Project of the University of California Cancer Research Institute and supported by grant funds from the National Cancer Institute of the United States Public Health Service.

Initiation of this program followed closely the decision in 1946 of the United States Public Health Service, through the National Cancer Institute, to assist medical schools in the improvement of cancer teaching by the award of undergraduate teaching grants beginning in 1947. Later these were extended to include dental and osteopathic schools. The awards are in the amount of $25,000 annually for the 4-year medical schools (including osteopathic) and $5,000 for the dental schools. The terms of the grant awards are extremely broad, the funds being utilized largely as the individual schools deem desirable in supplementing their own resources to improve cancer teaching. Thus, the pattern of expenditure has varied considerably from school to school, depending upon local needs pertaining to staff personnel, equipment, visual aids, visiting lecturers, etc. Not infrequently, pedagogical difficulties inherent in outmoded and crowded curricula have been brought into sharp focus and, thus, to the attention of the faculties concerned. In some schools experimentation in pedagogical methods has ensued. From the inception of the Teaching Grant Program, it seemed desirable that an attempt be made to evaluate objectively on a year-to-year basis the status of cancer learning by means of voluntary participation in a testing program.

The specific purposes of the testing program have been as follows: (*a*) to provide the participating schools with a means of self-evaluation to aid them in the appraisal and improvement of the cancer learning of their students; (*b*) to measure and analyze the nature of cancer learning in terms of acquisition, growth, integration, and retention, and (*c*) to determine the relationship of various patterns of instruction to student performance.

Although the Education Project has been supported by funds from the National Cancer Institute, there has been no attempt at any time to make participation in the testing program compulsory, nor to utilize results for determining the allotment of cancer teaching grants. At all times data pertaining

* This study was carried out in the Education Project which is supported by grants from the National Cancer Institute, National Institutes of Health, United States Public Health Service.

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[1] Henceforth referred to as the Cancer Test.

to the performance and standing of individual schools have been kept confidential by the staff of the Project, and results have been reported to the participants in such a manner that any individual school could determine only its own standing.

This paper is limited to a discussion of the Cancer Test and the evaluation program as it has been carried out in the medical and osteopathic schools. Data for dental schools are not strictly comparable and have been reported elsewhere (14). In addition to an overview of the testing and evaluation program, a report on a recently completed investigation which deals with the relative effectiveness of vertical and horizontal types of cancer instruction follows in Part II of this paper.

The Cancer Test.—The evaluative instrument consists entirely of multiple-choice items with five alternative responses, from which the student is asked to choose the *best* answer. The chief advantage of this type of item is that it affords ease, accuracy, and objectivity of scoring. The well constructed item is not limited to the measurement of factual knowledge but may also tap the broader aspects of learning such as the ability to interpret data, to show judgment, and to indicate understanding. The examination which is administered to medical and osteopathic students consists of 150 items designed to sample the various aspects of cancer knowledge. This includes all sites of neoplastic disease as well as diagnosis, biological characteristics, and treatment. (The test administered to dental schools is similar, but consists of 90 multiple-choice items and deals primarily with cancer of the head and neck.)

Participation.—The scope of the testing program has increased in terms of both the number of schools participating and the number of students who have annually taken the Cancer Test. Table 1 indicates the number of schools and number of students tested since the inception of the program. All but twelve medical schools have participated in the testing program at some time since its inception.

Validity of the Cancer Test.—The validity of any test may be defined broadly as the extent to which that test measures what it is supposed to measure (1, 2). All the available criteria of validity indicate that the Cancer Test is a valid instrument; that is, it measures knowledge of the subject matter, and *not* unrelated information.

The first and simplest criterion of validity is *face validity*. The test must *look* like a test of the specific field that it is reported to measure. The Cancer Test without doubt fulfills this specification, since all items deal with some aspect of neoplastic disease.

TABLE 1

PARTICIPATION OF MEDICAL AND OSTEOPATHIC SCHOOLS IN THE CANCER TESTING PROGRAM

Year	No. schools	No. tested
1949	32	9,358
1950	41	12,602
1951	54	17,620
1952	60	18,190
1953	65	19,608
1954	58	17,550
1955	59	18,000
1956	54	16,345
1957	58	17,506
1958	59	17,672

The *source of the test* items should also be considered. Each year the Cancer Coordinators of participating schools submit items which are considered for inclusion in the test. Since these items are submitted by those individuals most directly concerned with the teaching of cancer in their respective schools, and since the test is revised annually, its content tends to keep abreast of current cancer teaching.

If the test is a valid measure of the cancer knowledge of students, then a comparison of groups known to possess varying degrees of cancer knowledge should yield significant differences in test scores. A series of such comparisons has been made (3) and indicates that faculty and post-graduate groups receive significantly higher scores than do undergraduate students. In addition, comparisons of the average scores between dif-

ferent academic levels indicate an increase in cancer knowledge commensurate to the amount of instruction received in cancer and allied subjects. It has been suggested that some of the gain in test scores for successively higher levels might possibly be due to the drop-out of poorer students from the freshman to the senior levels, but analyses based on data for groups of students who took the examination for all 4 years of their medical education show gains which are quite similar (5). Chart 1 shows the distribution of test scores for the 1957 Edition of the Cancer Test, and may be considered as typical for any year. This figure indicates that the mean scores increase progressively from the Freshman through the Senior year. It also

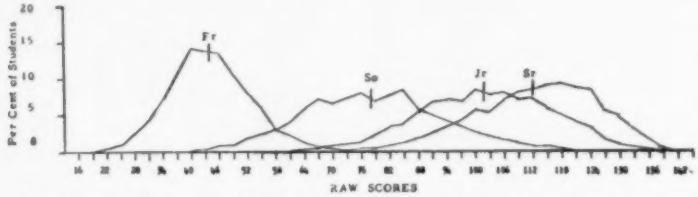

CHART 1.—Distributions of scores for all students on 1957 Medical Cancer Knowledge Examination. Vertical bar intersecting each curve represents the mean score.

shows a great deal of overlapping in the cancer knowledge of students, with some sophomores scoring considerably above the senior mean, and some seniors falling barely above the freshman mean.

Table 2 presents the national means scores, by class, for the period of 1949 through 1958. Examination of these data reveals a gradual increase in means from the Freshman through the Senior levels. These data are presented graphically in Chart 2 in terms of per cent scores for all students tested on all editions of the examination. This figure indicates that the average Senior graduating from medical school in 1958 knew considerably more about neoplastic disease than did the Senior graduating 10 years previously. It also presents information on the increased effectiveness of cancer teaching in the medical schools of the United States. Although it is conceivable that these data may reflect to some extent a factor of memory for test items (since at least two thirds or more of the items from each test edition have been retained for use in the edition immediately following), research data (5, 11) indicate that such gain is minimal and insignificant. Of particular interest in considering the effects of memory for test items are the data for the 1958 edition of the examination as shown in Chart 2. The 1958 edition included 46 items which had never before appeared in the Cancer Test. If memory for test items had played a major part in determining student performance, then one might expect a pronounced decrease in the national averages for that edition of the examination. However, no such decrease is noted, although there fails to be any increase over the past year. The absence of such a decrease might be attributable to the fact that new items were perhaps easier than those which they replaced, but past experience with the Cancer Test indicates that the new items are more difficult than those already incorporated from previous editions.

Of major importance in comparing results for successive editions of the Cancer Test is the problem of equivalence (i.e., in terms of comparative difficulty of various test editions). If, for example, the items introduced in successive editions of the examination have been less difficult (and available data indicate that this is *not* the case), then improvement shown over the years might well be due to this factor rather than improvement in teaching or memory of test items.

No group to which all editions have been administered for purposes of comparison has

been available, nor do the more recent editions of the Cancer Test contain a sufficient number of items from the first edition so that a year-by-year comparison based on this "anchor test" may be utilized. In the event that such data were available, however, the evidence would be far from conclusive; successive editions of the test might appear to be "easier," and this might only be a reflection of the fact that students in successive years have known more about neoplastic disease. In other words, it is virtually impossible to separate the effects of increased learning from changes in the examination itself.

Although the following features of the testing program are not properly considered measures or indicators of validity of the Cancer Test, they are of vital importance to any discussion of the examination.

One feature is the similarity of test content in terms of relative emphasis placed on various sub-topics within the examination. Table 3 compares the content of various editions by site, as well as by the general categories of diagnosis, characteristics, and treatment. This of course provides some means of comparing results from year to year.

A second and final feature to be consid-

TABLE 2

MEANS, RANGES, AND STANDARD DEVIATIONS FOR EACH EDITION OF THE "EXAMINATION FOR STUDENTS OF MEDICINE IN THE SUBJECT MATTER OF CANCER"*

		Freshman	Sophomore	Junior	Senior
1949†	Mean	51.0	80.4	98.2	107.4
	Range	5–97	34–127	49–142	51–145
	Standard deviation	9.0	13.8	14.6	14.5
1950	Mean	43.0	67.7	85.7	90.6
	Range	10–74	28–106	48–118	45–126
	Standard deviation	7.5	12.2	12.0	11.6
1951‡	Mean	42.4	70.3	90.0	98.2
	Range	17–64	36–109	49–125	50–124
	Standard deviation	7.6	13.4	12.9	12.5
1952	Mean	42.4	72.5	94.0	101.9
	Range	17–87	31–115	42–134	37–138
	Standard deviation	7.5	13.4	13.1	12.8
1953	Mean	41.0	72.9	95.6	104.8
	Range	17–99	34–118	43–136	59–144
	Standard deviation	7.6	13.1	14.0	13.1
1954	Mean	41.8	72.1	95.0	104.4
	Range	18–101	30–123	42–133	53–142
	Standard deviation	7.6	13.0	13.9	13.0
1955	Mean	42.0	73.2	97.2	107.5
	Range	16–85	29–122	41–135	58–138
	Standard deviation	8.0	13.6	14.0	12.7
1956	Mean	44.4	76.0	99.5	111.1
	Range	15–111	30–124	45–136	34–145
	Standard deviation	8.6	13.9	14.3	13.0
1957	Mean	44.1	78.2	101.8	112.3
	Range	19–93	35–126	40–142	33–141
	Standard deviation	8.9	14.9	14.2	13.2
1958	Mean	44.1	77.5	101.6	112.3
	Range	16–94	32–126	51–140	37–144
	Standard deviation	9.1	15.2	14.2	13.5

* Includes only valid papers.

† 1949 edition contained 180 items; subsequent editions only 150 items.

‡ Figures for 1951 based on a stratified, randomly selected representative sample of 400 students at each academic level.

ered is the fact that the better items of each edition of the test are retained for future use. This is not to be considered an indication of the validity of any single test edition but more directly indicates that the test shows steady improvement from edition to edition in terms of homogeneity, and possibly reliability. Those items which are not clear in content, which deal with information con-

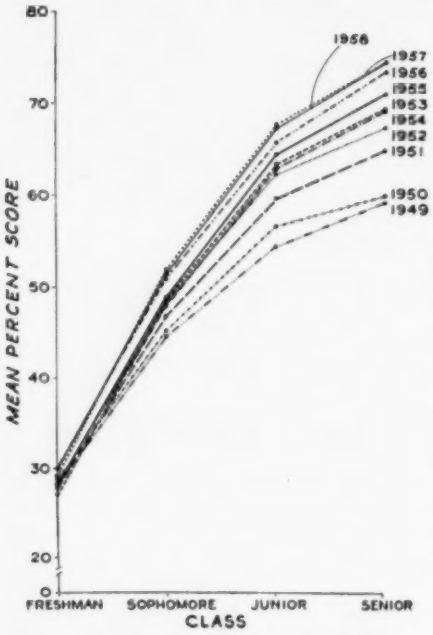

CHART 2.—Mean per cent scores for all students tested on ten editions of "Examination for Students of Medicine in the Subject Matter of Cancer."

sidered relatively unimportant by specialists in the field, and which fail to discriminate significantly when examined by means of standard objective statistical criteria are deleted from later editions. Those items remaining in the Cancer Test have passed the trial of use, without being found wanting by objective statistical tests (14) or the subjective evaluation by medical staff members. Chart 3 presents data relevant to this point and indicates that two-thirds or more of each edition consists of items found in previous editions. This feature of the Cancer Test also provides for relatively greater accuracy and reliability in the comparison of results from year to year.

Reliability of the test.—The reliability of a test is a measure of the likelihood of a given individual receiving equal or nearly equal scores upon successive administrations of the same examination presented over a short period of time. It is a measure of test consistency and stability, describing how closely the scores of students will agree when these individuals are tested repeatedly with the same or equivalent tests. Kuder-Richardson coefficients of reliability (4) for all editions of the Cancer Test have been computed. The range of these coefficients for the freshman classes has been from .52 to .64, while that for the second-, third-, and fourth-year students has been .80–.87. These data indicate that the examination is sufficiently reliable to be considered adequate for group evaluation and that it approaches a level of reliability sufficiently high to be acceptable for the evaluation of individual students.

Reporting examination results.—After annual preparation by the staff of the Education Project, the examination is administered by the participating schools. The tests are then scored and analyzed, and two reports are compiled. The first consists simply of a listing of students' names and raw scores and the computation of averages and measures of variability for each class. The second report is the more comprehensive and compares the performance of each class within each school with national averages, as well as providing detailed information on the specific strengths or weaknesses of cancer teaching in each school. In addition to presenting data dealing with the reliability and validity of the examination and presenting national norms for students and for schools (as already previously discussed in this article), the second report also compares the standing of each individual class within each school with that of all other participants. This is accomplished by

use of a figure such as illustrated by Chart 4, which presents the data for 1958. In this chart each school is identified by a code number selected from a table of random numbers to assure the anonymity of each institution. Examination of such a figure provides specific information for the school on its relative performance without revealing the position or identity of any other school.

The data presented to each individual school in this second report also deal with the specific strengths and weaknesses of cancer teaching. This is accomplished by the use of a topical analysis in which national averages and averages for each class within

TABLE 3

PER CENT OF ITEMS DEVOTED TO VARIOUS SITES OF NEOPLASTIC DISEASE AND TO THE CATEGORIES OF DIAGNOSIS, CHARACTERISTICS, AND TREATMENT

In all editions of the "Examination for Students of Medicine in the Subject Matter of Cancer."

Site or category	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
Skin	12	10	7	9	9	10	9	8	8	8
Head and neck	7	11	11	10	7	6	7	10	9	7
Chest	4	6	5	9	13	11	11	11	11	12
Endocrine	6	7	7	7	7	7	7	6	7	6
Digestive system	18	15	18	17	16	17	18	16	17	16
Urinary tract	2	3	4	4	5	7	6	6	5	6
Male genital	6	7	5	4	5	5	5	5	4	6
Female genital	10	9	8	9	9	9	9	9	11	11
Breast	9	7	10	9	9	7	7	9	8	7
Bone	2	3	5	5	5	4	5	5	4	4
Soft tissue	2	1	2	2	2	2	3	3	1	1
Nervous system	6	7	5	7	6	5	5	5	4	5
Lymphomas and leukemias	8	8	6	5	5	7	7	6	4	5
Unspecified	8	5	7	4	4	3	2	2	5	6
Diagnosis	25	30	33	33	33	40	37	37	37	41
Characteristics	56	49	47	47	45	40	43	43	44	42
Treatment	19	21	20	20	22	20	20	20	19	17

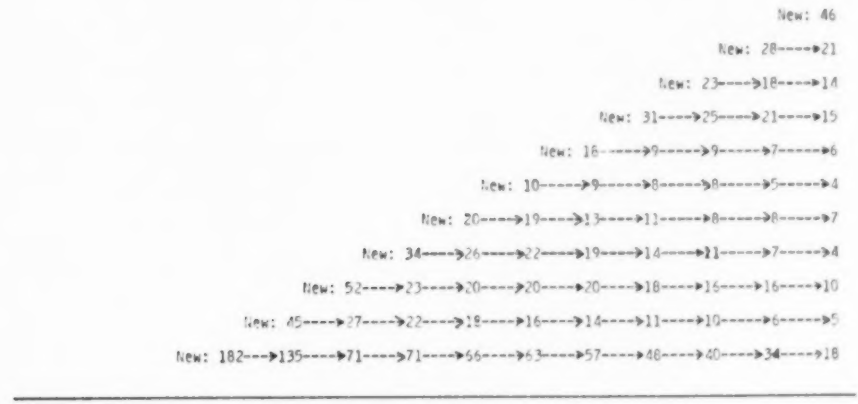

CHART 3.—Sources of items for each edition of the "Examination for Students of Medicine in the Subject Matter of Cancer."

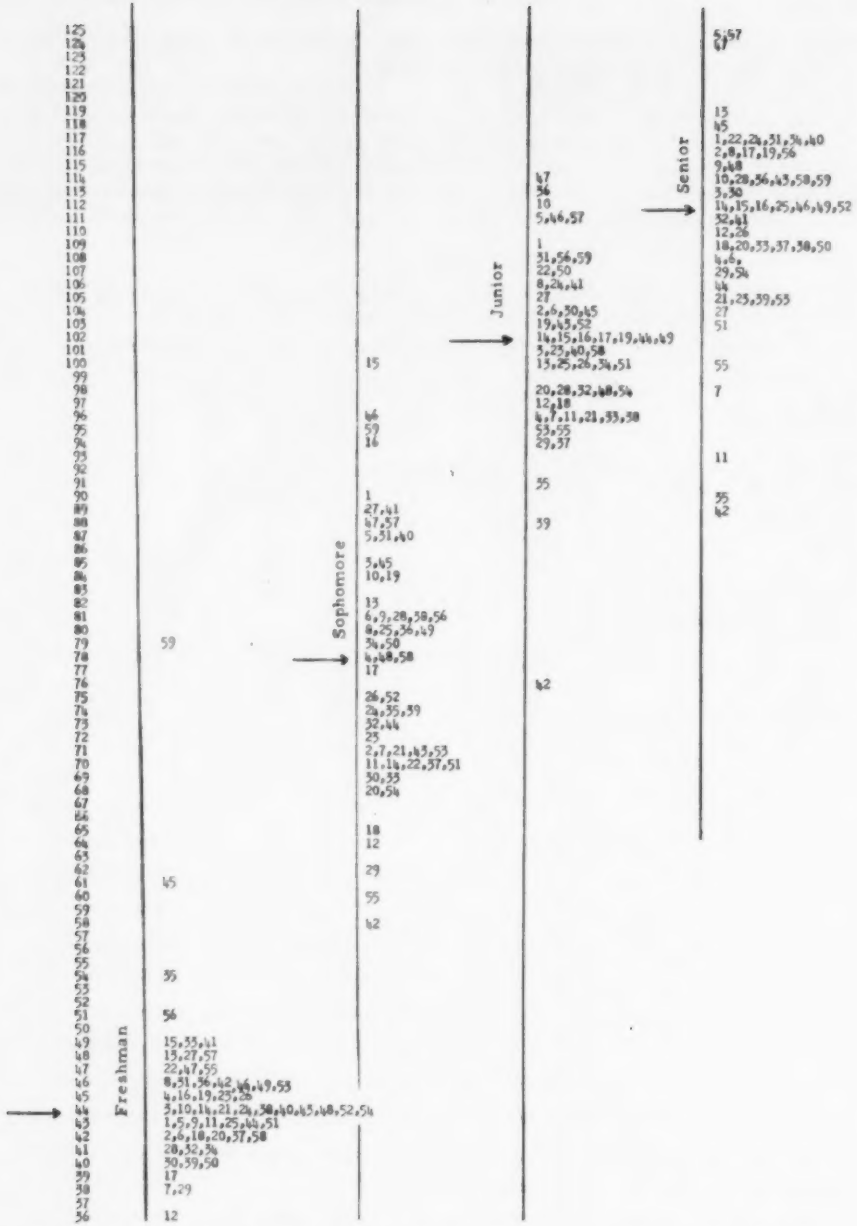

CHART 4.—Distribution of school mean scores on the 1958 "Examination for Students of Medicine in the Subject Matter of Cancer." (The mean scores are listed at the far left, while the numbers within the figure are the randomly selected school code numbers.) (→ = Mean of School Means.)

each school are computed. These computations are carried out for each site of neoplastic disease and within each site for its diagnosis, characteristics, and treatment. A sample specimen will be found in Table 4. Although a presentation of this type seems highly specific and relatively accurate, it must be borne in mind that some of these analyses are based on very small numbers of items and that their reliability as indices of the level of cancer teaching therefore tends to be rather questionable. In order to make the presentation of these data even more specific, the more recent reports have included a complete, item-by-item analysis of the performance of the sophomore, junior, and senior classes for each school. This method is designed to pin-point possible weaknesses in teaching by indicating items which are answered incorrectly by more than 60 per cent of the sophomores, 55 per cent of the juniors, or 35 per cent of the seniors. A sample will be found in Table 5; this method permits the presentation of data for each item without actually revealing its content.[2]

Research findings.—One question that frequently arises in a testing program such as heretofore described is whether the repeated use of test items affects the results obtained on the examination. One might suspect that this tends to augment the amount of gain shown in the results when they are examined longitudinally. This is not a unique problem, since any achievement testing program which uses item analysis to select and retain the better discriminating items for future use may encounter this problem. In a study devoted to this subject and dealing specifically with the Cancer Test it was found that: (*a*) the students were able to differentiate significantly between old and new items in terms of recognition, but (*b*) no significant correlation existed between the number of items a student recognized correctly and improvement in his score during three administrations of the examination (with a year intervening between successive administrations) (11).

Another question concerns differences and similarities in the organization of cancer knowledge by medical and dental students. Two studies have been carried out in an attempt to investigate this specific problem (6, 9). These have been factor analyses of the test scores of randomly selected and representative groups of medical and dental students. In the case of the medical students, the findings indicated that there tended to be a gradual integration of cancer knowledge from the freshman to the senior level. The dental student, on the other hand, fails to present this integrated cancer knowledge at the completion of his course of training. Rather, two separate and important factors appear in the results, namely, the diagnosis and characteristics of neoplastic disease. These results are not entirely surprising; one would expect the dental student to be much more concerned with the diagnosis and characteristics of cancer, simply because these are the aspects which are stressed in his training.

TABLE 4

COMPARISONS BETWEEN NATIONAL AVERAGE PER CENT SCORES FOR MEDICAL STUDENTS In each topic in the 1958 "Examination for Students of Medicine in the Subject Matter of Cancer" and Scores for Students in School: 03

		Diagnosis				Characteristics				Treatment			
		Fr.	So.	Jr.	Sr.	Fr.	So.	Jr.	Sr.	Fr.	So.	Jr.	Sr.
Skin	Natl	26	55	70	78	30	55	71	80	23	67	89	92
		23	61	80	81	35	63	83	86	20	71	96	95
Head and neck	Natl	32	52	71	80	32	53	66	73	45	70	79	85
		33	54	84	88	32	69	80	83	56	81	86	85
Chest	Natl	27	56	74	81	33	62	80	87	35	51	67	72
		28	64	86	88	43	70	93	94	38	49	73	85

[2] The levels selected are based on a figure computed by using a point approximately one standard deviation below the average per cent correct for each class on all items.

TABLE 5

1958 ITEM ANALYSIS DATA FOR MEDICAL SCHOOL 03

Topic of item														
	Diagnosis				Characteristics				Treatment					
Histories and physical exam	X-ray	Laboratory and special techniques	Etiology	Incidence	Biology	Histology, pathology	Metastasis	Prognosis	Surgery	X-ray isotopes	Chemo. and hormonal	Site	Sophomores, 40% or less correct responses	Juniors, 55% or less correct responses	Seniors, 65% or less correct responses
×												Brain and cord			
								×				Thyroid	×	×	×
			×									Testis, penis			
							×					Unspecified			
								×				Rectum			
									×			Large bowel			
		×										Bladder			
×												Skin, carcinoma			
									×			Oral cavity			
×												Small bowel			
									×			Bladder			
									×			Oral cavity			
											×	Prostate			

To determine how the typical medical and dental students learn about cancer, several longitudinal studies of the learning process of medical and dental students have been carried out (5, 14). In general, they tend to indicate that the greatest gains in cancer knowledge take place in the second and third years of training and that these gains are highly correlated with training in pathology.

Investigations into the effects of specific teaching methods have been carried out (13) and indicate that a variety of teaching methods are effective depending upon the academic level at which they are utilized. A rather apparent finding is that the lecture method without the concurrent use of other teaching aids or methods seems to be the least effective. The second part of this series of papers details the most recently completed investigation in the comparative study of types of curricula.

Studies comparing the performance of medical and dental students, as well as the performance of medical and osteopathic students, have also been completed and published (10, 15).

Advantages and disadvantages of a national testing program.—The advantages of an evaluation program such as has been carried out for the last 10 years are fairly obvious. A program of this type provides objective data on the strengths and weaknesses of cancer teaching in the participating schools. Such comparative data would be difficult to obtain through other means.

Disadvantages, on the other hand, are not quite so obvious. These pertain to limitations in the type of pedagogical research which can be undertaken, the fact that not all schools participate in the program, and the need of a final criterion or yardstick of effectiveness in terms of cancer knowledge retained after completion of undergraduate training. Although more than 242,000 scores for the cancer examination have been accumulated in files of the Education Project, the paucity of correlational data made available by participating schools for purposes of research limits their usefulness. The fact that not all schools in the nation, either medical or dental, participate in the program might be considered a potential disadvantage. However, within all types of schools, a majority do participate: approximately 60 per cent of the allopathic schools of medicine, 80 per cent of the dental schools, and 100 per cent of osteopathic schools. It is felt that the sampling thus obtained is sufficiently large to be representative of most phases of cancer teaching in the United States. Thus, this does not present so serious or significant a disadvantage as one might be led to believe initially.

Finally, in weighing the advantages and disadvantages of a national testing program, it is essential to consider as a final criterion the amount of "cancer learning" that is retained after the student has been graduated from his professional school. Primarily, we are interested in assuring that an individual will go forth in his profession with a more thorough and rational knowledge of neoplastic disease than has been customary in the past. This raises the questions, "Does the possession of knowledge in itself result in a doctor or dentist who is better prepared to recognize, diagnose, and treat neoplastic disease?" "How much factual knowledge is actually necessary for this purpose?" A corollary of this problem is the very basic question of "Just what constitutes a good doctor?" A lack of definition in this field, as well as certain practical problems incident to examination of graduates once they have entered practice, makes further investigation in this direction extremely difficult.

Evaluation of the testing program.—To be considered is the final question: "Are the results of this examination actually affecting teaching methods and cancer learning?" Data already presented would seem to indicate that there has been a gain in cancer learning by the typical students graduating from medical, dental, and osteopathic schools since the inception of the cancer testing program. Whether the gains shown at the senior level are directly attributable to the increased emphasis on cancer teaching

and learning or to the efforts of the Project and the Cancer Test is difficult to determine. The simple fact that results are reported to any individual school on its strengths and weaknesses in cancer teaching does not, of course, guarantee that each school uses these results to the fullest extent.

As the result of a recent request by the National Advisory Cancer Council, some data have become available on the effectiveness of the cancer testing program. In the course of a survey conducted for the Council, questionnaires were sent to all schools that had participated in the cancer testing program at any time since its inception. One hundred and twelve questionnaires were sent out; of these 102, or 90 per cent, were returned.

The first question posed by this survey was whether cancer teaching at the schools concerned had been either benefited or improved as a result of participation in the cancer testing program. Of those replying, 94 per cent replied in the affirmative, 5 per cent replied negatively, and 1 per cent did not reply. Most respondents indicated that they felt that the major contribution of the testing program had been twofold: (*a*) motivation of students and faculty and (*b*) the pointing out of strengths and weaknesses in the curriculum.

The second question posed was whether there had been any adverse effects at the schools as the result of participation in the testing program. The data indicate that 4 per cent felt that there had been some adverse effects, whereas 96 per cent felt there had been no adverse effects whatsoever. Those replying in the affirmative generally commented that the examination took too much time out of an already crowded curriculum.

The final question utilized in the survey was whether the cancer testing program should be continued: 85 per cent responded affirmatively and 11 per cent negatively; 3 per cent gave somewhat indifferent responses, and 1 per cent failed to reply. On the basis of this response it would seem that the cancer testing program had been not only successful but thoroughly accepted in the medical, dental, and osteopathic schools in the United States.

This paper has been devoted to the description of a national testing program designed to evaluate the teaching and learning of cancer. The program is now in its tenth year. If one were to judge by the opinion of its participants, the program has been highly successful in providing means of motivation for both students and faculty toward increased cancer knowledge. It has also provided a unique source of information regarding certain strengths and weaknesses of cancer teaching. Similar or more extensive evaluation programs might well be useful in other important areas of medical and dental education.

The Cancer Achievement Testing Program

II. A Comparison of the Effectiveness of Vertical and Horizontal Cancer Instruction

PETER G. LORET, PH.D., RICHARD J. RANKIN, PH.D., and N. ELANE WILCOX, PH.D.

INTRODUCTION

In a recent investigation (12), Wilcox found that medical students showed greater gains in cancer knowledge as measured by an objective achievement examination when trained under the horizontal type of cancer teaching curriculum as compared with the vertical type of cancer teaching curriculum. Her study was based on data for 3,869 medical students who had been graduated from 25 schools of medicine in the years 1953, 1954, and 1955. Of these 25 schools, eight used a horizontal approach, and seventeen used a vertical approach. For purposes of the investigation, the following definitions were adopted:

Horizontal or Departmental.—There are no scheduled cancer courses, including scheduled seminar or panel series, which exist on the basis of other regular courses.

Vertical (diagonal or oblique) or Interdepartmental.—In addition to such instruction as may be given in the departmentally taught classes, courses specifically oriented to cancer are taught.

Table 1 summarizes descriptive curriculum data for the schools which were classified as falling into the category of "vertical." Classification was based on detailed interview schedules completed in the course of visits to each of the participating schools. The following data were utilized for all subjects included in the investigation: scores at the sophomore and senior academic levels on the "Examination for Students of Medicine in the Subject Matter of Cancer" (henceforth referred to as the Cancer Test) and the Verbal and Quantitative scores of the Medical College Admission Test (henceforth, the MCAT). Wilcox's approach was to categorize all students as being taught either by the horizontal or vertical method, on the basis of the teaching methodology utilized at the school which the students attended, but without regard to year of graduation. Mean gains were computed for these two groups, and it was found that the gain from the sophomore to senior level in Cancer Test scores was significantly higher for the group receiving cancer instruction under the horizontal type of curriculum. This difference was statistically significant at $P_{.005}$.

These findings were somewhat questionable in light of the fact that, although Cancer Test scores were controlled by means of a co-variance technique, the mean MCAT scores for the horizontally taught group were found to be significantly higher than for the vertical group (see Table 2).

It was therefore felt that it was necessary to undertake further analyses of the data in order to determine what effect each type of program achieved when comparisons were made between groups matched on an *individual* for *individual* basis in terms of sophomore Cancer Test and MCAT scores.

Sample.—The sample used in the present investigation was that originally obtained by Wilcox (12) in cooperation with the Education Project (Cancer Research Institute, University of California School of Medicine)

and the Association of American Medical Colleges. Basis for inclusion in the sample was that the medical school had participated in the Cancer Testing Program from 1950 through 1955, that MCAT scores were available, and that the school was willing to cooperate in the study. Table 3 presents a list of the cooperating schools; only those 25 schools which were classifiable as either vertical or horizontal were included. (Six of the original 31 schools maintained a curriculum which could not accurately be described as horizontally or vertically oriented.)

TABLE 1

DESCRIPTION OF SPECIAL CANCER COURSES IN SEVENTEEN PARTICIPATING SCHOOLS CLASSIFIED AS "VERTICAL"

Description	Attendance required?	Minimum number of hours
Six hours of cancer lectures each; 3d and 4th year	Yes	12
One hour per week lecture-conference; students examined at conclusion; 4th year	Yes	25
Twelve "theoretical" and twelve "practical" 1-hour lectures; 3d year	Yes	24
Lectures and demonstrations; 3d year	Yes	33
Two-hour weekly tumor conference; 3d and 4th year	Yes	144
Nine lectures, twelve seminars; 3d year	Yes	31
Eight "correlation conferences," team teaching; 4th year	Yes	8
Joint panel discussion; required for 3d year, elective for 2d and 4th years	Yes	22
Weekly seminar, panel; 4th year	Yes	28
Tumor conference; required 3d year, elective 4th	Yes	28
Oncology course, panel; 3d year	Yes	12
Ten lectures on biology of neoplasia; 2d year	Yes	10
Biology of neoplasia; 1st year; tumor conferences; 3d year; oncology course; 4th year	Yes	49
Six cancer seminars; 4th year	Yes	6
Twelve hours clinical cancer conference; 3d year; Lectures (23–30); 4th year	Yes	37
Cancer course; 4th quarter of 4th year	Yes	22
Cancer conferences; 4th year	Yes	30

Range of minimum number of hours of special cancer teaching: 6–144; mean number of hours of special cancer teaching: 31.

TABLE 2

MEAN MCAT VERBAL AND QUANTITATIVE SCORES IN TERMS OF HORIZONTAL AND VERTICAL INSTRUCTION

Score	Horizontal N = 1257	Vertical N = 2612	Difference	P
MCAT Verbal	517.53	511.32	6.21	P > .05
MCAT Quantitative	534.67	515.00	19.67	P > .005

Procedure and findings.—In the investigation reported here, the students graduated in the 3 academic years under consideration (1953, 1954, and 1955) were treated as separate samples, primarily because of the fact that the Cancer Test had undergone annual revision and because it was therefore felt that the most valid approach would be based on a comparison of students who had been given the identical examination during the same year. The samples thus obtained, with means and standard deviations for each of the variables utilized, are presented in Table 4.

It was the conclusion of the investigators that the most appropriate variables on which to match students would be the MCAT Verbal, MCAT Quantitative, and the sophomore Cancer Test scores. The

MCAT Verbal and Quantitative scores were selected because of their acceptance as an index of general ability. The sophomore Cancer Test score was considered to constitute a stable and reliable base from which gain might be measured.

The process of matching consisted of selecting from the two groups (horizontal and vertical teaching) for each year under consideration those students in one group for whom there existed in the other group a student whose scores on the sophomore Cancer Test, MCAT Verbal, and MCAT Quantitative scales differed by no more than *one point* on any variable. (In the case of the MCAT scores, the matching procedure was based on a two-digit standard score.) This procedure may best be described as person-for-person matching. The matched samples thus obtained, and data on all variables, are presented in Table 5.

To test the null hypothesis of no difference in gain between sophomore and senior Cancer Test scores, significance tests incorporating the formula for the standard error of difference between mean gains in a correlated series were utilized (7). In each of the three samples the significance tests indicated that the differences found were statistically significant at P_{05} or beyond. Thus, the null hypothesis was rejected for each of the three samples. Data found in Table 6 indicate that the mean gain in each of the three samples matched for initial ability is significantly greater for those students who were taught under the horizontal type of cancer instruction.

The data for the present investigation were examined in the light of Robert L. Thorndike's note regarding the regression problem in a matched group design (8), which indicates that samples have a tendency to regress toward the mean of the population from which they are drawn. It may be seen from the data in Table 4 that in each case the regression phenomenon would tend to nullify the difference between the groups. Thus, regression is *not* a factor which might account for the difference between the two groups.

DISCUSSION

Although both Wilcox's investigation and the present re-analysis of the data tend to indicate the superiority of the horizontal type of cancer instruction, several important points should be considered before acceptance of the statistically based finding that superior results are to be expected from the *absence* of special cancer instruction. Carried out to its logical conclusion, this finding might well be interpreted as indicating that traditional cancer teaching methods provide the best known ways of teaching cancer and that other investigated methods can, at best, be considered inferior in terms of student performance on an objective cancer examination.

It does not seem unreasonable to suspect that certain factors may have been operant in some medical schools which have resulted

TABLE 3

PARTICIPATING SCHOOLS

Albany Medical College
Baylor University
Boston University
University of California
University of Colorado

Creighton University
Duke University
Georgetown University
George Washington University
Medical College of Georgia

Howard University
Indiana University
Jefferson Medical College
University of Kansas
Louisiana State University

Marquette University
College of Medical Evangelists
University of Minnesota
University of Nebraska
State University of New York: Syracuse

Ohio State University
University of Oregon
Medical College of South Carolina
University of Texas: Southwestern Medical School
Temple University

University of Virginia
Medical College of Virginia
University of Washington
Wayne State University
Western Reserve University

Woman's Medical College of Pennsylvania

TABLE 4

MEANS AND STANDARD DEVIATIONS: SAMPLES

Year of graduation	Curriculum	N	Variable	Mean	S.D.
			Cancer test (So.)	72.65	12.05
			MCAT—V	513.13	84.63
	Vertical	659	MCAT—Q	513.63	91.34
			Cancer test (Sr.)	105.24	13.15
1953					
			Cancer test (So.)	69.00	15.26
			MCAT—V	517.46	93.51
	Horizontal	354	MCAT—Q	531.10	93.50
			Cancer test (Sr.)	105.25	13.24
			Cancer test (So.)	73.96	12.40
			MCAT—V	506.38	90.68
	Vertical	925	MCAT—Q	509.59	93.64
			Cancer test (Sr.)	104.58	12.84
1954					
			Cancer test (So.)	70.85	12.72
			MCAT—V	509.57	87.51
	Horizontal	440	MCAT—Q	524.23	89.51
			Cancer test (Sr.)	107.02	13.28
			Cancer test (So.)	72.85	12.60
			MCAT—V	502.61	88.04
	Vertical	1028	MCAT—Q	506.61	89.33
			Cancer test (Sr.)	106.60	12.79
1955					
			Cancer test (So.)	72.16	12.70
			MCAT—V	511.05	92.55
	Horizontal	439	MCAT—Q	532.51	94.81
			Cancer test (Sr.)	110.89	11.93

TABLE 5

MEANS AND STANDARD DEVIATIONS: MATCHED SAMPLES

Year of graduation	Curriculum	N	Variable	Mean	S.D.
			Cancer test (So.)	72.59	10.30
			MCAT—V	517.42	67.22
	Vertical	97	MCAT—Q	531.44	64.53
			Cancer test (Sr.)	104.28	12.83
1953					
			Cancer test (So.)	72.52	10.36
			MCAT—V	518.04	67.33
	Horizontal	97	MCAT—Q	531.44	63.43
			Cancer test (Sr.)	107.91	12.89
			Cancer test (So.)	71.45	10.41
			MCAT—V	489.34	67.77
	Vertical	166	MCAT—Q	513.55	70.17
			Cancer test (Sr.)	103.92	12.32
1954					
			Cancer test (So.)	71.54	10.43
			MCAT—V	488.80	67.36
	Horizontal	166	MCAT—Q	513.13	70.40
			Cancer test (Sr.)	106.41	11.24
			Cancer test (So.)	71.78	10.72
			MCAT—V	505.52	76.16
	Vertical	165	MCAT—Q	520.24	79.95
			Cancer test (Sr.)	105.22	13.25
1955					
			Cancer test (So.)	71.64	10.55
			MCAT—V	505.09	76.65
	Horizontal	165	MCAT—Q	520.24	79.96
			Cancer test (Sr.)	110.15	10.90

in their selection of a specific type of cancer teaching program. It would appear legitimate to hypothesize that those schools which are "satisfied" with their cancer teaching program and which show objective evidence of a comparatively high relative standing would tend to maintain the status quo—thus, to retain the traditional type of program which is characterized by a lack of any special cancer instruction. However, a review of the history of contemporary cancer teaching programs under the aegis of the National Advisory Cancer Council and the National Cancer Institute induces one to defer any conclusion regarding the uniform introduction of special cancer instruction in the "poorer" schools, although some schools with a relatively low standing may tend to attempt to compensate for this "deficiency" by the provision of special cancer courses.

Although objective evidence is not available, it would be most interesting to be able to investigate the changes which might take place in the performance of a relatively high-ranking institution which had provided no special cancer instruction in the past but had now changed to a curriculum in which such supplementary special instruction was provided.

A second factor which may serve to explain the apparent lack of effectiveness of the special type of cancer instruction is the mis-use of the special cancer courses. Unfortunately, the so-called special cancer course, rather than providing special and more detailed information on neoplastic disease over and above that provided by the regular curriculum, frequently may have become the principal means of cancer instruction, rather than providing a means of detailed supplementation.

In conclusion, one may accept one of two possible interpretations. Either the horizontal approach may be credited clearly and unquestionably with producing greater mean gains and higher final scores on the Cancer Test than the vertical approach, or one may assume that the findings of this investigation merely reflect the modifications which have taken place in the ideal concept of the special cancer course through its actual application in practice.

TABLE 6

GAINS AND SIGNIFICANCE OF GAINS: SOPHOMORE TO SENIOR CANCER TEST SCORES MATCHED SAMPLES

Year	Curriculum	Initial score	Final score	Gain	Difference in gain	Significance of difference
1953	Vertical	72.59	104.28	31.69	3.70	$P > .05$
	Horizontal	72.52	107.91	35.39		
1954	Vertical	71.45	103.92	32.47	2.40	$P > .05$
	Horizontal	71.54	106.41	34.87		
1955	Vertical	71.78	105.22	33.44	5.07	$P > .01$
	Horizontal	71.64	110.15	38.51		

SUMMARY

Using three matched samples of students who were graduated from 25 medical schools in the years 1953, 1954, and 1955, students were matched for initial ability or aptitude by a one-point matching technique on Medical College Admission Test Verbal and Quantitative scores, as well as on the score obtained at the sophomore level on the "Examination for Students of Medicine in the Subject Matter of Cancer." Gains from the sophomore to the senior testing on the Cancer Test were compared, and the findings are as follows:

1. In each of the three matched groups under consideration, the horizontal type of instruction yielded greater gains in cancer knowledge from the sophomore to the senior levels than did the vertical.

2. Further investigation showed that this trend was no different from that evidenced by the original groups of students from

which these matched samples had been drawn.

3. The findings of this investigation clearly support those of Wilcox's study.

4. The present investigation seems to indicate, at least tentatively, that, given students of identical ability or aptitude, greater gains in cancer learning will take place under a curriculum in which there is no special cancer instruction as compared with one in which special cancer instruction is provided. Several reasons for the apparent ineffectiveness of special cancer instruction are presented.

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Some Aspects of Health Education for Medical Students

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The success of a doctor in maintaining the health of his clientele or in restoring them to health when they become ill is often as much dependent on the cooperation of the individual in doing his part as it is on the skill of the physician. Unless the individual changes his behavior in the manner which the doctor may prescribe, the professional treatment and drugs given or prescribed are not likely to be effective.

The dictionary defines a doctor as a "teacher." In the past, we have often considered that "teaching" or "instruction" by the doctor was all that was necessary to bring about a given behavior change. Today we recognize that successful teaching or education—the kind which affects the behavior of people—consists of more than the verbal information and instructions which a doctor may give. In fact, this latter may be of quite minor significance, as compared with other influences that determine the individual's actions.

Anyone who has ever stood on a seashore and felt the waves come in over bare feet knows the strength of the undercurrent. Look at the surface; the water runs in lazy ripples up the beach, yet underneath any solid object the undercurrent carries away the sand and moves the object in the opposite direction. If you look only at the surface, you never know the power below the surface: so with education for behavior change. Real power is often in hidden situations and in less visible means than the obvious information-giving procedures so commonly followed. There is need, therefore, for the doctor to learn, during the time he is a student, as much as possible about the less obvious ways his clients learn and change their health practices as well as the procedures that appear successful in various situations.

The medical student is taught the fundamentals of cell structure, of anatomical and biochemical knowledge which has accumulated over the centuries. Less often does he study the accumulated knowledge about the factors that influence what people know, how they feel, and the way they behave. Such basic information is found in studies about emotions, perception, levels of social status, religion, individual differences, and family and other group loyalties.

In his medical training the doctor learns to respect the complexity and interrelation of physiological conditions, the intricate balance of metabolic process, the complex yet delicate mechanisms of repair in the normal body, and the linkage of these processes so that imbalance in one part affects many other parts.

The processes and forces which contribute to education are just as subtle, complex, and may become just as much in or out of equilibrium as the physical forces and processes for which the physician acquires so much respect. Effective education requires an analysis or diagnosis of these complex factors first; a knowledge of the possible reactions to a variety of methods by which change might be effected; competence in selecting from among these methods those

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most likely to influence the person in the situation, and skill in applying the methods to a particular individual or group.

Acquiring this knowledge and developing proficiency in its use are long and involved processes. Thorough competence in the area would require as much effort as is needed to acquire full knowledge about the body and disease. Since it is indeed a long process, it is possible in this paper only to indicate some of the basic principles and the way they operate.

Some basic principles of learning.—First, all behavior is motivated and that motivation comes from within the person, not from forces outside. One is motivated as one strives to achieve some conscious or unconscious goal he or his group has set. Sometimes the goals of an individual whom the doctor is trying to reach are the same as those of the doctor. In such situations there is a greater possibility for ready communication between the doctor and patient. More often the goals of the two people are quite different, although the surface reactions may appear the same.

People are motivated to do those things which they believe will help them do something they want, acquire something they desire, or avoid something that is annoying. In other words, they are motivated to do anything that satisfies their wants or contributes to the solution of their problems. Most of us who are working in the health and medical field assume that everyone is striving to be healthy and needs only to know how to achieve that goal. Actually only those people who are ill, recognize their illness, and are concerned about improving their health are motivated to do anything about health. Instead, they have other goals that are more urgent to them. Often these goals are hard to recognize and the physician may miss them unless he has been taught how to look for them and to respect them.

Second, learning is an active process. It occurs only through the person's own efforts. Yet because doctors are busy people they often do not take the time to provide for their patients' active learning experiences. The physicians carry on the major activity in giving information, often leaving the patient in a completely passive role. A medical student became exasperated with a diabetic patient because, on her first return visit, she was unable to give an accurate report on her urine readings when he "had showed her how to do it." One wonders if the patient had been given an opportunity to practice what she had been taught about the method of testing her urine before the initial learning session was over.

Learning is not only an active process, it is a continuing process. We learn through a variety of sources and over a period of time. The person who would educate another needs to recognize that he is responsible for creating more than one opportunity for an individual to learn. In the simplest situation, a doctor may tell a patient, then have the patient tell back what he is to do, and then the doctor will write out the instructions so the patient can check when he gets away from the doctor's office.

Third, a person selects what he sees, hears, or feels in terms of his past and present feelings, and experiences. His interests and goals determine what he learns. Furthermore, what each person learns will be different, because each has a highly personal background of experience and point of view. This principle operates in a wide variety of ways. Let us look at some of them. The doctor who is trained in medical skills has acquired his understanding over a long period of time The individual who lacks this training may react with considerable emotion to suggestions which have come to seem quite simple to the physician. For example, one hospital reports that a staff physician insisted that a Mexican-American patient remove the red string about his wrist, and follow his medical advice. The patient turned away. Eventually he went to another doctor. The second appreciated that to the patient the string had the power to keep away evil, and was, therefore, necessary for his health. The doctor allowed the patient to wear it and to credit his recovery to this device rather than entirely to the

medical treatment. Undoubtedly, the patient saw the first physician as threatening some of the most important values by which he lived and was unable to accept medical advice until it fitted in with his past experience and beliefs.

People select what to pay attention and respond to within the boundaries of what they believe or feel. When people do not observe all the things others think they should, it is not really random and unaccountable. In careful studies of what people do pay attention to, it became clear that there is always a reason in terms of things which are important to the person or have special meaning for him. A group of people traveling by the same plane or train will see and describe quite different aspects of the trip. Or, consider the situation in which information is being given in a lecture on cancer before a women's group. Some of the undercurrents in the audience are:

"I just went to my family doctor. He doesn't think that's necessary, and I wouldn't feel right about suggesting it to him."

"That's all right for the other fellow, but it doesn't apply to me."

"I'd be afraid to know. What would it mean to my relationship to my husband if they found anything?"

"My but Gloria Ramirez' hair looks pretty that new way. Wonder if Robert would like mine cut that way?"

"Oh, my goodness! I promised Johnny's teacher that I'd stop by school today. She'll think I'm not a proper mother. Maybe he'll quit talking in time for me to make it. Wonder what's wrong with Johnny this time."

"My grandmother died of cancer. I remember how terrible she looked. And all that pain. I wonder if my sister could have it? She's been complaining of that pain again. It would be so dreadful if she were to go through all that. Wonder if I could talk to her about it. She doesn't like it when folks talk about things like that."

"If Mary Beth will go to her doctor, I think I'd like to go along. It's a good idea."

Though the information given is identical, the goals, interests, and past experiences such as illustrated above will influence what each member of the audience learns.

Fourth, a person will change his behavior when he sees that the action will help him achieve a goal that is important to him. Behavior is seldom changed because a person is told what to do. Every physician should learn that there is a difference between the giving of information and the acquisition as well as the understanding of the information given. Even when the information is understood, it may not be acted upon because the information does not contribute to the realization of the patient's goals or his beliefs about what he should do. The factors which produce any given behavior are complex; and they are held in equilibrium—a homeostasis like the body's own. It is important for physicians to interpret to the patient how the behavior they want him to adopt is related to improvement in his own health. Even when well related to the health need, the patient may not carry out a suggested action when it is in conflict with other values or feelings in his life. Things which the physician has long since taken for granted may appear quite wrong to the patient. Failure to find out about such personal elements sometimes defeats the clinician's goal of improved health in his patients.

The woman with anemia, told to eat liver and red meat, may remember why the physician considers it important; but in line with the custom of her family, meat goes first to the husband, and secondly, if there is any, to the young children. If she should place herself first, the disapproval of the grandmother, who lives with them, might be more than she could bear. Also to follow the diet would do violence to her ideas of herself as a wife and mother. It is easier to ignore the physician's suggestion than to offend the grandmother; it is especially easy, if he has only remarked casually, "Eat lots of red meat and liver." The thoughtful physician may ask questions until he finds out about the woman's feelings. He can then adopt his teaching to take her feelings into account.

Fifth, what an individual learns and the

behavior he will adopt depends in large measure on the attitudes of the *groups* to which he belongs. Most people conform to the accepted standards and sanctions of family and friends. These group factors influence whether information is accepted or rejected. They are usually hard to identify because they are not ostensible, clear, or conscious bases for people's actions.

For example, when a Greek is ill, he does not like to show any need for care. Fortitude and firm will are ever present qualities in Greek values. A man cannot seek solace in bed for fatigue or indisposition lest he appear to be giving in to a desire for pampering. Even to fall asleep is to give in; the term is "sleep caught me." On the other hand Greeks have strong feelings of family kinship and responsibility to the family. It is cruel to tell a Greek that he must stay in bed and do nothing for himself; it is much kinder (and advice is more likely to be followed) to explain to his wife or other relatives that he must take special care of himself so that the sick one will not be put in the position of asking for this special treatment.

On the other hand when a Burmese villager is ill, it is he who immediately sends for a physician, for drugs, for treatment. The difference in attitude of the Greek and Burmese groups will largely determine their response to instruction for improvement in health. There are equally important differences in attitude within the subgroups of a culture. It, therefore, is essential to study the group attitude before attempting to bring about behavior change.

Some barriers to learning.—There is a serious barrier to education about which the medical student should be helped to develop insight. This might be described as the negative aspects of the medical setting in which the patient finds himself. These may lie in the physical setting, the administrative procedures, the status relationships between nurses, physicians, aides, and patient which prevent the flow of adequate communication of information, and the negative connotations of procedure, interview, and treatment.

The doctor needs to recognize the emotional atmosphere created in the patient who presents himself to the doctor. The patient is usually uncomfortable, and apprehensive. He is in a situation where he does not know what to expect, and in such a situation any of us is wary. The doctor asks a host of questions, many of them quite personal; some seem remarkably irrelevant to the patient. He often invades the privacy of the patient in his examination. The uncomfortable feelings aroused make it difficult to take in information from the physician.

Such negative states interfere with learning. The student needs to be helped to grow in insight about what it means to be a patient. Perhaps every medical student should have the experience early in his student life of being treated as a clinic patient in a teaching hospital (unknown to the clinic staff as a student). If given a simulated illness under the guidance of a professor, he should then be registered, have the social, economic, and medical facts of his life elicited by the customary process; wait until called for, perhaps by a number; and have his case discussed in front of him by the customary teaching group, followed by a series of instructions to change his health practices. Later, with his class, he should have a chance to discuss what happened, how he felt, what instruction he was given. The latter should be compared with what the physician recorded as his instructions. The class might consider how to facilitate the educational aspects of the program as if they were in charge. Such experiences will help him to recognize the negative feeling states that may interfere with learning.

How to overcome or minimize such negative learning situations can be taught the student through the positive experiences in treatment he himself receives. The student health service should provide the kind of thoughtful medical care which the students will be expected to give to their patients later. Often their personal educational needs

may be brushed aside because of an assumption that, since they are in a school of medicine, they know the answers. Medical students are particularly apt to conceal their anxieties or to have them multiplied by the pressures of the situation. Consequently, special thought should be given to this aspect of their need. What the physicians hold of value will be what the students learn to value. If education of the patient is belittled, then the student will be held back from fulfilling his educational role adequately when he is on his own.

A second possible barrier to education is that the information and instructions may not be given in terms of the facilities available to the patient in his community, home, economic situation, and particular culture. For example, in situations where clocks are not in common use, instructions to give medications at 3-hour intervals are meaningless. Another adequate time symbol, within the framework of daily routine which the person would follow naturally, can be found by the thoughtful person.

Another barrier to effective education is the frequent difference in meaning assigned to scientific terms by the layman and by the medical profession. Scientific or professional words that have become commonplace to the physician may be misunderstood or weighted with fear and misconceptions for someone who has a nonscientific background. As a simple example, many people think that a low sodium diet means "to stop using table salt." Most people do not understand that sodium may be high in some foods even when salt has not been added, or in sources they may not even recognize as foods.

Educational aids.—Information-giving and education of the patient can be greatly enhanced by simple visual techniques. A rough sketch of the organ involved or a picture saved from a journal, kept at hand in a desk drawer, may amplify and make clear the verbal description—it is not enough to tell the students they should have these when they get out in their own practice. Their teachers should use such devices simply and naturally in the school setting so that students have personal experience with their value and their simplicity. Teachers could also plan assignments for students to practice creating simple visual tools, so that they help the student get past the barrier of strangeness which keeps many people from taking the first step in using a new device.

The wise physician, who understands that he is only one of many forces and channels in the educative process, will tap other channels of communication to the patient such as the nurse, nutritionist, aide, health or welfare agency, and sometimes the other patients. Family and group members can understand and help to reinforce the information given. The physician can set the stage for patients to learn from other people than himself; thus, he may refer the diabetic patient to nurse, nutritionist, and group classes. If he does this in a manner which respects the contribution each of the others can make, he creates a situation in which the patient is likely to learn more. There is evidence that many physicians underestimate the other professional and community resources for education of the patient. Doctors need to become thoroughly familiar with these resources so that they can assess their value as fully as they do the diagnostic process. By so doing other sources of communication to the patient can be set in motion.

The physician's strategic role.—The physician is in a particularly strategic role to help forward desirable health behavior change. In fact, he has an opportunity which is open to no one else. If he understands the way people learn and those factors that foster or hinder learning, he can use his role to greater advantage for the patient. There are three factors which set the stage for this unique advantage.

a) The first of these is that people are seeking help when they come to him. They are already somewhat motivated to accept change and will use advice readily. Ordi-

narily, most people protect themselves from change. When they become uncomfortable enough to turn to a physician for help, they have already changed from their customary pattern and are in a state of readiness to learn what they must do differently in order to become comfortable again.

The motivation to accept change is present as long as the patient is ill or uncomfortable. It is quite another thing when the physician goes into the preventive aspects of medicine. He is then dealing with circumstances in which people are more or less satisfied, or in which they are called upon to change their behavior when they see no need for change. Accustomed to ready acceptance of his advice in illness, the physician may be hurt or angered by apparent indifference to his advice about the prevention of illness or some other unrecognized health problem. He should remember then, that each individual patient's needs are different and are likely to vary depending on his physical and emotional condition. The educational methods to be effective must be tailored to fit the patient's condition.

b) In most cultures, patients have confidence in the advice of physicians and tend to follow it. Usually the physician is an authority figure whose word in matters of medicine has greater weight than that of other people. This is partly because society expects the doctor to fulfill one of its most important roles. In most societies the healing role is accorded high status. The person growing up in the society accepts this value and gives the same status to the words or treatment the doctor offers. In most situations the physician can use his role with confidence that his words and actions will carry weight.

However, there are cultures in which doctors do not possess this prestige role. The role of the healer may be taken by the magician, the grandmother, the *curandero*, or the medicine man backed by the tribal council. These have long established values understood by the society in which the person has grown up.

In such situations, the doctor will do well to recognize the status of the accepted healer and utilize the status that the latter holds as a means of interpreting health practices to the people. Medicine men and doctors have worked together in Navajo hospitals, satisfying the feelings of the Indian patients and at the same time improving health and health practices through scientific advice and treatment.

In urban areas, within the same family one may find the married daughter who turns to the midwife and the granddaughter who goes to the obstetrician. For medical care during their pregnancies, each may exhibit little regard for the general practitioner. In other communities, these attitudes are reversed. Some of the images that society and the person construct of the physician and his role become barriers to the acceptance of modern medicine. Other images of the healer's role enable the insightful physician to enhance his educational function.

The manner in which the doctor adapts to the role expected of him by the people will influence what they learn. The doctor needs to develop sensitivity to the different inner images patients may have of his role, and respond in terms of their expectancies. This objective understanding of "role" and use of self calls for maturity and insight. These can be nurtured in the process of medical education.

c) Because of the high status position of the physician, his own health practices serve as guides to patient behavior. Here one should emphasize the necessity of doctors practicing what they preach. The doctor should be the first to have his children immunized for diphtheria, whooping cough, tetanus, and any other recommended preventive practices for children in the country where he lives. His own participation in getting a chest *x*-ray in a mass survey; of using goggles when he visits an industrial plant in which this is the recommended (but seldom observed) practice; of inquiring whether milk is pasteurized when he travels in country new to him, help people to accept such practices which may be new to them. The matter-of-course way in which he does such

things gives confidence and security to people less sure about the need for such measures. They will be more likely to adopt the same behavior in time.

SUMMARY

Education of the patient is essential to the success of any medical practice insofar as the doctor is dependent on the patient for cooperation in carrying out the practices.

Some of the more important principles about learning, which underlie the analysis and selection of educational method in any situation are:

1. All behavior is motivated from within the person as he strives to achieve some conscious or unconscious goal he or his group has set.

2. Learning and changing behavior require active participation on the part of the learner.

3. Each individual selects what he sees, hears, and feels because of past and present feelings and experiences. Therefore, what each person learns in given situations is different because each has a highly personal background of experience.

4. People will change their behavior when they see the recommended action as meeting a felt need. Behavior is seldom changed because of "telling."

5. The attitudes of groups to which each of us belongs are significant forces in preventing or facilitating change in regard to health behavior.

Because of the strong status role society confers upon the physician, he has an exceptional opportunity to contribute to the well being of mankind. This extends far beyond the recovery of the individual patient. As the proficiency of doctors increases in their understanding of the learning processes and ways in which to stimulate behavior change, their effectiveness in the over-all healing role will continue to be enhanced.

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MEDICAL EDUCATION FORUM

Editorials

EXPERIMENT AT BUFFALO

A primary objective of this Journal is to publish information on experiments in medical education. In this issue, there is a report of an Institute at Buffalo which documents information that has developed during a 3-year study of the teacher's role in the learning process. The nature of this program deserves comment.

The Buffalo study is an example of the intellectual fruits that can be gathered from collaborative effort between medical faculties and other University departments. Representatives of education, sociology, and psychology have joined with the medical school in this project. The techniques utilized in measuring educational effectiveness and attitudes would not have been available without such collaboration. We talk a great deal today about the potential contributions of the University environment; the Buffalo experiment gives solid support to this tenet.

The role of the professional educator in the advancement of medical education is a moot question. Should medical school teachers be taught to teach by representatives of Schools of Education? The report indicates that at Buffalo the professional educator made a valuable contribution to the program. Now it will be interesting to see if similar benefits accrue as the program is initiated in four additional medical schools.

A second Institute will be offered at Buffalo on June 9–18, 1959, and the requests for invitations will undoubtedly rise as the report of the 1958 Institute is perused.

The whole art of teaching is only the art of awakening the natural curiosity of young minds for the purpose of satisfying it afterwards.—ANATOLE FRANCE.

JOHN Z. BOWERS, M.D.

Address

THE PUBLIC CONCERN

RAY E. TRUSSELL, M.D.

It is a pleasure to welcome this new class of medical students to Columbia. I am privileged to take part in these opening exercises and to speak briefly about a subject which is fundamental to my field of Administrative Medicine, namely, "The Public Concern."

The next 4 years of your lives will be an intensive, demanding, challenging, and rewarding period, during which time you will learn the rudiments of the art and science of modern medicine. Through learning scientific principles and detail, daily contact with your faculty, professional growth under supervision, exposure to research, and the acquisition of certain skills and attitudes, you will ultimately arrive at that momentous day when you will receive the degree of Doctor of Medicine.

A few decades ago with 4 years of such training, you would have been considered able to perform any medical or surgical procedure. In the past 50 or 60 years, however, medical progress has occurred at a breathtaking pace when viewed in the context of previous centuries. Your faculty will impart to you their firm belief, in which I share, that several more years of training will be necessary before you enter into public service as a duly licensed physician.

No doubt such a far-flung forecast, which suddenly places you in 1966 as a specialist with minimum qualifications, or a general physician with perhaps a year of practice behind you, seems very remote. Right now most of you would settle for a guaranteed promotion into the sophomore class of 1959. Nevertheless, given current trends, a few of you will remain in academic life, but most of you, between 7 and 10 years from now, will enter community practice in some form; and surely, with all the training you have had, and in a country as progressive and prosperous as ours, you and the rest of our profession will be ready, willing, and able to serve the public through the provision of top-flight medical care.

The public in turn will look to you and your fellow physicians to be available when needed, able to provide good care, interested, up to date, and constantly seeking new ways of prevention, diagnosis, and treatment for your patients. These phrases can be used as criteria to describe the public concern. . . . Will you be available? . . . Will you be able to practice good medicine? . . . Can the public afford you? . . . Will you be interested in your patients? . . . Will you be up to date? . . . Are research findings and their clinical application moving hand in hand? Such questions and many others increasingly concern the public and its leaders—whether governmental or private.

Today I have elected to talk briefly about some manifestations of this public concern. I will deal with certain tangible activities, leaving the intangible aspects of our professional-public interaction as something which you will appreciate more readily with years of training and experience. In effect, I will describe certain features of the climate in which we as a

profession, collectively or in part, attempt to live up to the simple criteria I have listed, a climate created in part by scientific progress and public education for which the medical profession deserves its fair share of credit, and in part by social and economic forces over which physicians have no control.

In speaking of the public I am merely reflecting the fact that collectively as a profession it is up to us to do the best we can to provide medical care to all segments of our population —the well-to-do, the unemployed, the young, the aged, the farmer, the laborer, and any other group or individual.

Evidence of public support for the medical profession is overwhelming. The institutions in which we acquire our education, do research, and care for the sick are supported by a combination of endowment income, current contributions, earnings, and governmental revenues—all from the public. Millions of dollars are contributed each year by local communities to our voluntary health agencies. In recent years Congress has appropriated many millions more in research funds for the National Institutes of Health than were requested. This year the Hill-Burton Program for hospital construction, which has been very successful in expanding and improving hospital facilities as well as securing a better distribution of physicians throughout the nation, has received the largest congressional appropriation ever made for its purpose. Fellowships, traineeships, research funds, research facilities construction funds—wherever a need is adequately demonstrated, our public has acted in due time. Furthermore, through the mechanism of voluntary health insurance, millions of citizens have made financial provision for the cost of medical care for themselves and their families. These examples could be multiplied, but they should suffice to show that we are indeed a privileged profession. We have great knowledge at our command, and resources in personnel, facilities, and funds for the application of this knowledge. Where, then, does the public concern arise?

Let us return to our simple list of questions with which I characterized the public concern with you and your future colleagues. Today I can do little more than leave these questions with you and hope that you will contribute toward a positive answer for each.

Few events are more frustrating or frightening to the patient and his family than inability to secure a physician in an emergency. When you are in practice will you arrange coverage on your day off? Will you rotate weekends on duty in your community? Will you help staff the commonly unstaffed emergency room in your hospital? Will you take your turn on your medical society emergency roster?

Perhaps more fundamental in the long view in many communities is the question: "Can you be available?" If you enter certain specialties, all important and necessary, it will be impossible for you to survive economically in many medium- and smaller-sized communities unless you are a member of a group practice, subsidized by the public, or welcomed by the practicing profession who will call on your specialized knowledge and make it possible for you to earn a living. The lack of such welcome is not unknown in certain areas, and the resistance of some of your future colleagues to group practice in any form is a matter of record. As a consequence, it has been necessary for many public groups—trustees of hospitals, consumer cooperatives, unions, and management—to take action in creating situations where medical coverage and medical knowledge in its broad panorama have been made available. This is a trend which is accelerating, accompanied by certain differences of opinion, such as the well publicized accusations against the closed panel policies of the United Mine Workers countered by documentation of the events which brought about these

policies—a documentation which suggests that a few physicians can damage the reputations of many.

At the turn of the century the doctor's black bag was a symbol of hope and little else. A well trained physician could do almost anything considered to be good medical practice. He was the captain of nonexistent troops. The hospital was the place where one went to die. Medicine as you will learn to practice it was unknown.

Today scientific medicine is ramifying with unbelievable speed and intensity. It has become a highly technical complex requiring physicians with advanced training, a corps of skilled co-professionals and assistants, expensive and complicated equipment and facilities, and an organized array of other types of community services. No physician can practice all of medicine. The hospital is becoming a center for health services, a place to live, not to die. Today a doctor's black bag, while more than a symbol, still is but a combination of a first aid kit and a repository for scientifically tested medications which make it possible to take care of many patients at home safely.

As physicians who will practice until the year 2,000 or longer, how will you deliver your share of present and future scientific and social knowledge to your patients? Will you go it alone? Or will you become a part of an organized program? Will this organized program be a partnership, a group practice of specialists, or of specialists and general physicians, a group with branch groups covering a region, a group based in a diagnostic clinic or in a hospital (perhaps affiliated with a university medical center), a group reimbursed through fee for service, salary, capitation or through some other prepayment method, a group paid by government, a union, or union-management jointly or by industry alone? Each of these forms of medical practice, with the avowed purpose of providing modern medical care, exists in the United States. Which are better for the public and the profession and under what circumstances? Such questions are the subject of much debate—often emotional—and, happily, of much research. Several foundations, consumer groups, and the Public Health Service are financing objective research in the medical-care field. The list of such agencies and the projects they are financing is too long to document here, but it demonstrates the fact that the problems of providing medical care are a proper subject for study and are being studied. In spite of the research that has been done and the experience gained, there still exists a large number of physicians who adhere to the belief that solo practice and free enterprise in community hospitals are the *only* way to practice medicine. Any deviation by other physicians from this traditional pattern results in attack and a denial of the principle that in our country every physician has the right to decide under what circumstances he will serve his patients. One state medical society has even introduced legislation which would make a physician who worked for a salary guilty of a felony punishable by imprisonment.

To the patient and his family an illness is a total experience, and the total cost is something which must somehow be met. Hospital costs have gone up 258 per cent since 1946, and there is reason to believe they will increase further. Charges for physicians' services have also increased and in some situations seem uncontrollable. To meet this problem voluntary insurance has emerged and has grown unbelievably since the early 30's. There are many unsolved problems, however, some of which will be directly under your control as physicians. One of these is hospital utilization. Physicians admit patients to hospitals, prescribe what services they shall receive, and determine how long they will stay. Hospital utilization, directly under the control of the physician, continues to climb upward each

year. The effect on the health insurance plans such as Blue Cross which pay the bills from the subscribers' pooled premiums is catastrophic. Several plans have had to ask for large premium increases, and these requests have caused public concern and sharp criticisms in public hearings. Governmental or quasi-public studies or investigations are now under way in at least five states. State superintendents of insurance who have considerable authority are watching the situation closely, and in Pennsylvania a sweeping ruling has already been issued, having a direct bearing on the practice of medicine, a ruling based on a growing belief that health services are a public trust, subject to public review.

You, as future physicians, will have to share the responsibility for keeping the costs of medical care at as low a level as possible—but compatible with good medicine. For example, at present if the average length of stay of Blue Cross patients were reduced ½ day and if one in every 50 Blue Cross patients were kept out of the hospital through some other form of care, the saving in Blue Cross payments would be many million dollars a year in New York State alone. Since length of stay and admission rates are a function of the physician's decision, the opportunity to render a public service is inescapably obvious. Yet we must not be stampeded into arbitrary action. The foundation of good practice is a good diagnosis. If diagnostic procedures are not to be rendered to an in-patient, then they must be financed and provided on an ambulatory basis. If the patient is to have a shorter length of stay in the hospital, then home care at one-fifth or one-sixth of the cost is the alternative. Fortunately, during your next 4 years you will have an opportunity to examine two excellent affiliated teaching hospitals which have ambulatory diagnostic clinics and have given home care for many years—the Mary Imogene Bassett Hospital in Cooperstown and Montefiore Hospital in New York City.

Beyond exercising reasonable prudence with respect to hospital utilization for his patients, the physician's most direct effect on the cost of medical care is his own fee schedule. Will you overcharge your patients? Will you fail to observe the service benefit agreement you have entered into for your Blue Shield patients? Will you gradually raise your rates to take advantage of the lack of fixed-fee schedules under certain forms of commercial health insurance, thus contributing to the creeping inflation which is much more costly than the occasional excessive bill? Examples of these practices are common and have caused so much concern that certain consumer groups are establishing alternative systems of care through salaried group practice in community hospitals—the United Auto Workers being the most recent example.

And finally, there are those groups without insurance or other resources—the aged, the unemployed, the minority groups, the medically indigent. Further public action on behalf of such people is inevitable and requires intelligent and reasonable participation by the profession.

Medical care is a highly personal and privileged interchange between the patient and his physician. To belabor this point is to take up the time of this audience. When a single patient seeking care on his own is dissatisfied with an individual physician he can change physicians and there is no public reaction. However, when large groups of people are dissatisfied with their group system of medical care their reaction can, indeed, result in a large-scale decision on the part of their leaders. Among the many studies of medical care which have been done in the past few years is one which involved detailed interviews with patients comparing different systems of medical care under which they had received physician services. There were two outstanding aspects of the patients' assessment of good care: First,

the interest of the physician in the patient and, second, the adequacy of his care—usually measured in terms of thoroughness. People are neither insensitive nor ignorant, and when they react in large groups to their individual care their concern is translated into group decision to modify the way in which they receive care. Such changes are occurring yearly and are worthy of careful observation for the significant factors which bring them about.

One of the most critical questions facing the public is how to be sure that they will receive medical care which is based on current scientific advances. When you graduate you will have accumulated more factual and up-to-date knowledge in less time than you will ever have an opportunity to repeat. After you receive your degree you will acquire more experience, but each year more new discoveries will be available to you. How will you and your colleagues keep up-to-date? Through active staff membership in a well organized, accredited hospital? Through refresher courses? Through membership in specialty societies? Through self-discipline? Through medical society membership? Will you help physicians who have less training than you or will you help shut them out of your hospital? Will you go downhill to the point where you keep no records and are dependent on drug salesmen for your medical information? Each question I have asked of you illustrates a current problem of greater or lesser dimension which can be documented by observation of physicians now in practice. The informed public is increasingly aware of many if not all of the implications of these questions. Some organized groups are now as concerned with the quality of medical care they are purchasing as they were previously with the quantity they could purchase. The United Mine Workers did not change by accident from a fee-for-service program which paid any physician for any kind of a service, to a system of hospital-based group practice. It was not by coincidence that the first large-scale meeting held by the United Auto Workers to review their currently developing medical care program was devoted exclusively to the question of how to assure that a high quality of medical care be provided. While these two large unions are in the public eye now, much is going on behind the scenes—all intended to assure that physicians can and will continue to practice modern scientific medicine.

Traditionally, governmental standards which affect medical care are minimal. We need no better evidence than the licensing laws in some states which admit individuals who have secured a medical degree in countries where, owing to the forces of history, medical education does not approach the minimal standards insisted on in the United States. Yet thousands of such individuals enter this country each year and participate in the care of the public.

Hospital licensing laws, also, are usually based on certain physical facilities and safety standards. However, government at times has had to establish strict regulations to protect life—such as the standards for the care of newborn infants who were exposed to fatal epidemics in hospital nurseries. A review of governmental interest in the quality of care turns up many observations such as insistence on paying only qualified specialists to provide rehabilitative services; and in one state a study is being developed to establish standards for general supervision of the quality of care provided throughout all hospitals.

Traditionally, however, standards established through the continuous self-growth of professions have been far in advance of the minimal requirements of governmental agencies who in fact usually derive their rules from professional groups.

One of the very real problems in keeping up-to-date is to find the time. Physicians who work alone have much more difficulty in this respect than those who are members of organizations with a policy providing funds and time.

And perhaps the most intriguing challenge of all in finding time is to make a maximum effort to reassign functions to other professions. Much of the physician's daily burden consists of procedures which can be done very well by personnel with less extensive training, yet firmly entrenched problems of professional status and traditional role are encountered when efforts are made to lighten the doctor's work load. Perhaps we are ready for a national commission on How to Protect the Physician from Himself.

In living up to our responsibilities, it is well to remember that we are utterly dependent on the lay citizen for everything we have and do. He is a necessary and inevitable partner, and, as in business partnerships, he is entitled to facts and to his share in policy-making. Since the layman and the physician have different but necessary competencies which are complementary in the provision of medical care, special problems in communication and common decision-making arise.

In the hall of the 8th floor of this hospital in the Department of Medicine you will see framed a quotation by Dr. Dana Atchley. To quote:

> As the physician has been able to give up the magic that was once the chief stock and trade of the most honest practitioners and assume the role of scientific adviser to his patient a new quality of integrity has entered the relationship. The atmosphere is that of an honest and candid interchange, the patient responding to the penetrating interest implicit in a modern diagnostic study and the physician reacting from the self-confidence and humility that comes from scientific insight. Such honesty is the firmest foundation for rich human relationships.

Just as we have arrived at sharing responsibility and knowledge with the individual patient, so must we do this with the public. Scientific research into ways of providing medical care is accelerating. New knowledge obtained objectively rather than to prove a social philosophy is conditioning the thinking of those who are responsible for planning, organization, and administration of medical care programs. It is in the area of planning, organization, and administration that the public has the most to contribute to the future of the profession and to the quality of the medical care which they will receive. As a profession, we have been more than successful in appealing to the lay public for support. However, much of the public support has been based on faith rather than on mutual understanding and participation in policy-making. Some of it must be classed as due to tolerance, frustration, or confusion. There are strong indications that the public's concern with the performance of its health professions will be manifested more and more in action based on facts, and less on emotion. If this is the case, it is a healthy sign and offers physicians, hospitals, and prepayment plans a dynamic opportunity to improve communications and to bring about better understanding of what is needed for the improvement of our health services, to cooperate in more experimentation with ways of providing medical care, and to assure continued support of research and education. To do so will improve the morale of the lay-professional partnership and its productivity. To do otherwise will increase or perpetuate tensions and serve as real or assumed justification for unilateral decisions, some of which may be contrary to the best interests of the profession, and in the long run of the public.

Much of what I have had to say may seem self-evident; yet in times of stress, when I have dealt with some of the problems I have been discussing, I have often been reminded of a satirical definition of "self-evident"—that which is evident to oneself and no one else. You who are entering the College of Physicians and Surgeons this fall approach the practice of medicine at a time when there are many alternative ways of bringing to the public what you will come to know. It is my hope that you will approach your consideration of how you

can deliver medical care to your patients with the same objectivity you will use in the study of new scientific developments in the treatment of heart disease, diabetes, or cancer. And particularly I hope that you will not fail to join hands with those responsible leaders of the public who will want your guidance and expert advice as to what is the best medical care, and to help them solve the problem of securing it. Medicine is no longer a mysterious priesthood. As a profession it has always been a public trust. Now, however, it is under public scrutiny as never before, a scrutiny which must be aided in its search for the best if medicine is to retain its professional freedom to grow—a privilege which can be protected through understanding and trust in a partnership in which each, the public and the profession, must respect and support the needs of both. May I conclude by wishing you the utmost success.

ABSTRACTS FROM THE WORLD OF MEDICAL EDUCATION

The Fate of Psychiatric Clinic Outpatients Assigned to Psychotherapy. DAVID ROSENTHAL and JEROME D. FRANK. The Journal of Nervous and Mental Disease, Vol. **127**, pp. 330–43 (Oct.), 1958.

The purpose of this study is to obtain some evaluation of the effectiveness of individual psychotherapy with outpatients of the psychiatric clinic. Several characteristics of this specific category of outpatients are examined (sex, age, race, income, source of referral, motivation, etc.) in relation to the psychotherapeutic outcome. The authors' findings are compared, whenever possible, with those obtained in the few relevant existing studies (listed among the bibliographical references at the end of the paper). However, while the latter were all based on retrospective analyses of clinic records, the present study was planned beforehand, and the data were collected systematically and simultaneously with the investigation. Since a patient's psychotherapy may be affected by various aspects of his experiences at the clinic, the ways of operating of the Henry Phipps Psychiatric Clinic (Baltimore), where the study was undertaken, are discussed in detail. Over 1000 new patients per year were seen at the clinic during the 3-year period covered by the investigation. The psychiatric outpatient population varied in degree of illness from little, or none, to very marked. Twenty per cent were ill enough for hospitalization; 35 per cent were only seen for diagnosis and did not require psychiatric treatment but were referred elsewhere; 45 per cent were referred for further treatment, but only 17 per cent of them for individual psychotherapy. The number of patients in this group considered in the study was 384. Through tabulation of the mentioned characteristics of these patients an attempt was made to determine on what criteria selection for psychotherapy is based. It was found that at the Phipps Clinic, as elsewhere, psychiatrists tend to refer for individual psychotherapy significantly more white than Negro patients, and of those, preference goes to the younger psychoneurotic patients, who are better educated and in the upper rather than the lower income range. The preferences shown are in accordance with the hypothesis that psychiatrists consider as good candidates for psychotherapy those patients with whom they can expect to communicate more easily, and whom they therefore deem most likely to benefit from such treatment. A disturbing fact brought out by the investigation was the failure of many patients (one of every three referred) to accept psychotherapy when it became available, even though he had previously agreed to it. Social class factors were also significant in this connection: patients of the lowest educational and income levels were most likely to refuse psychotherapy. As to the question of what kind of patient derives most benefits from psychotherapy, tabulations show that 42 per cent of those who accepted psychotherapy were rated as improved at the time of termination. Of the eight characteristics taken into account, only *motivation* approached the level of statistical significance in the question of improvement, although, contrary to expectation, it was the low motivation group which showed the highest rate of improvement. Three of every four patients were rated as "stopped coming" (without the therapist's consent). Approximately three of every five were discharged as *unimproved*, and only 17 per cent of all who

received psychotherapy were discharged as *improved* (the optimal benefit accorded). Various tables inserted in this paper show in detail the data on which the findings are based. In the conclusions drawn from them, it is pointed out that insight-based psychotherapies seem to be less effective with psychiatric outpatients than with patients in some other type of setting. However, more knowledge is needed of some of the factors which affect treatment (for instance, the part played by the patient's faith in it). Also needed is a better understanding of the application to the therapeutic process of the established principles of learning, group dynamics, self-concept, and social influence. It is hoped that in the future a series of new diagnostic and therapeutic methods will make possible a more rational selection of different types of treatment for the different types of patients. The first step toward realization of this hope would be a willingness to experiment more freely—under carefully controlled conditions—with various therapeutic approaches which already have been proposed.

Hygiène et Médicine des Anciens Peaux-Rouges (Hygiene and Medicine among the Ancient Red Indians). ROBERT LAULAN. La Presse Médicale, pp. 1645–46 (Oct. 22), 1958 (Paris).

In this survey of French sources—mostly the works of missionaries written in the 16th, 17th, and 18th centuries—on the habits of hygiene and medical practice among the ancient Indians of Canada, the author reminds us that we owe the first observations on therapy practiced among the North American Indians to Jacques Cartier, the discoverer of Canada. Cartier, however, deals with only two diseases—scorbutus and syphilis—and their miraculous cure by the mysterious *anneda* (made from the rind of a conifer tree). More substantial data on medical knowledge and practice among the Indians were not published until 100 years later, in the work by Friar Sagard of the *Recollect* Order (settled in Canada in 1615), which appeared in Paris, in 1623, under the title: *Le grand voyage au pays des Hurons situé en Amérique vers la mer douce et derniers confins de la nouvelle France.* Father Sagard, a naive and somewhat superficial observer, full of the general concepts and prejudices of his time, ventures into the field of comparative medicine by establishing a parallel between ancient Egyptian medicine and that of the Hurons, finding the latter "more advanced." Although he is unable to draw a line between natural medicine and thaumaturgy and lacks Cartier's inquisitive spirit, the author points out that some interesting data for medical research may well be extracted from his work. While his information on the use of herbs and drugs is limited to naming a few (such as, besides the *anneda*, one called *oscar* and another *ondachiera*, used to "purge phlegmas and humidity of the brain among old people"), he is the first to offer a detailed description of the *suerie* ("sweatery"), popular remedy and preventive medicine among the Hurons, and considered by Father Sagard a truly marvelous method to stay in good health. It consists in the artificial inducement of profuse perspiration, followed by the intake of—and ablutions with—great quantities of cold water. Other noteworthy observations concern the Hurons' treatment of mental cases (the afflicted are kept in strict isolation) and their approach to the problems of old age (the custom of drowning aged parents is attributed to the charitable intention of sparing them the sufferings of decrepitude). The *Moeurs des sauvages américains, comparées aux moeurs des premiers temps*, published in Paris, 1724, by the Jesuit Father Lafitau, contains more exact observations on a greater number of diseases and their treatment. It also makes a clear distinction between natural and supernatural medicine. The first is considered by Father Lafitau a specially rewarding subject, since the two Americas are rich in medicinal plants and herbs which effect wonder cures. Some surgery was also practiced by the Indians, in cases of rupture, dislocations and fractures, but they were terrified by the Europeans' use of the scal-

pel. Father Lafitau admires the native wound-healing methods, by means of theriacal water (from plants, trees and animal extracts), while he shows disgust over their abuse of purgatives and vomitives, which, he writes, "are of a nature to kill a horse." On the whole, he finds the natives endowed with strong and robust constitutions (attributed to "sweeter, less salty and more balsamic blood"). Gout, lithiasis, apoplexia, and sudden death were unknown among them, and only to the contact with Europeans did they owe smallpox, scorbutus measles, "purple fever," and other epidemic diseases. Phthisis, however, he found to be a frequent affliction among Indians "in their bloom," and one of the greatest killers. Venereal diseases, imported from Europe, were treated with gayac wood shavings, and patients were kept isolated in huts in the middle of the forest. Diets prescribed for therapeutic reasons were limited to abstention from certain foods judged contrary to the character of the illness. Natural medicine was supplemented by thaumaturgic practices, and divines, being considered doctors of a superior order, were consulted to know "the innate desires of the soul" and to interpret and conjure fate. The work of another Jesuit, Father Charlevoix, *Histoire et description générale de la nouvelle France* (Paris, 1744) also contains valuable information, although a good deal of its material proceeds from the older sources already mentioned.

Inaugural Lecture. JEAN BAUMANN. La Presse Medicale, pp. 1–6 (Jan. 3), 1959 (Paris).

In his inaugural lecture the first titular of the Chair of Anesthesiology (just created at the Sorbonne's School of Medicine) stresses the urgent need of specialists in this branch of medicine. The immediate aim of anesthesiology must be to insure its service in greatest safety to all patients, keeping always in mind the concept that "anesthesia is a thing terribly simple and simply terrible." Statistical data show, however, that in France—the same as in the U.S.—attainment of that goal will be far from easy because of the acute shortage of specialists. Three solutions have been proposed: (1) Speeding up the production of specialists by a year's shortening of their training. To this, Prof. Baumann voices strong opposition, as well as to the second, the so-called "English" solution, namely, that (2) of employing "semi-specialized" doctors. He points out the "hypocrisy" of this term which, as recent surveys in the U.S. and in Britain have shown, is a cover-up for the fact that many pretended "semi-specialized" anesthetists are merely general practitioners who from time to time give anesthesia and often are nothing but "authentic three quarter ignorants." The dangers of such an approach to the problem are evident in the data on mortality from anesthetics contained in the British survey. For the moment, to palliate the dramatic shortage, the author would prefer the third solution, (3) the recourse to specialized nurses. He also suggests the main lines for a reorganization of the service in public hospitals that would comprise the official appointment of full-time specialists combined with the employment of "out and in" anesthetists recruited without competition. From the "quantitative" Prof. Baumann then turns to the "qualitative" aspect of the problem. He points out that the difference between "anesthesia" and "anesthesiology" is that between a technique and a science. His definition of this branch of medicine comprises not only knowledge of, and practical skill in, all kinds of anesthesia but integrates into it the study of the physio-pathology of surgery and the practice of pre-and post-operative care. He warns against mistakes and pitfalls often found among members of the specialty, such as immoderate claims of their ability, "inconsiderate expansionism," as well as "unreasonable exclusivism," disaffection for what is not specifically their interest, and the negation of the "team principle" for the sake of an unrealistic aspiration to absolute autonomy.

Modern Trends in the Teaching of Pathology. H. A. MAGNUS. The Medical Press, pp. 839–41 (Sept. 3), 1958 (London).

The science of pathology began a hundred years ago with the discovery of cellular pathology by Rudolf Virchow. Toward the end of the 19th century, when departments of pathology and bacteriology were established in the universities, modern subdivisions of the science began to appear. All those aspects of the subject related to the diagnosis of disease in the living patient were called "clinical pathology" and were regarded as more the concern of the physician than of the pathologist. This view conditioned the teaching of the subject, giving rise to the systematic lecture devoted to the instruction in detailed descriptive and cellular pathology and the morphology and cultural habits of pathogenic bacteria. A great number of universities still continue to put emphasis on these aspects of pathology; in others, modifications in the teaching have taken into account the rapid changes in medicine which have taken place in the last 20 years. Efforts have been made to abolish the traditional sharp line of demarcation between the courses in pathology and physiology. Some universities have adopted the method, developed especially in the U.S.A. (there, in the opinion of many, "the pendulum has swung too far"), of presenting, at an early stage of the student's career, a series of lectures, followed by demonstrations and practicals, on certain basic aspects of all four branches of pathology. The author (Professor of Morbid Anatomy at the University of London, and Director of the Pathology Department of King's College Hospital) believes, however, that a better method is the institution of a 2- or 3-month introductory course (after the second medical examination and before starting on the wards), which should consist mostly of lectures and demonstrations on basic pathology intelligently integrated with some clinical teaching. Institution of such a course, now organized in most teaching centers in England, is considered by the author "one of the most notable advances made in the teaching of pathology in recent years." Furthermore, in many medical schools the traditional practice of teaching general pathology and morbid anatomy by a long series of often boring systematic lectures is being replaced by other methods which make the subject much more alive and interesting to the student. Improvements in teaching histology, bacteriology, and chemical pathology, and in the attendance of the post-mortem room ("cornerstone in the teaching of morbid anatomy") and the museum are also discussed in this paper, as well as some ways of integrating the teaching of clinical medicine with that of all branches of pathology (one such way is the clinico-pathological conference). Brief consideration is also given to the institution of clerkships (during which students do "clinical pathology" for 1–3 months), revision courses (here the author believes there is a lot to be said for the old type of "pot grind"), and problems of postgraduate teaching under the National Health Service.

The Need for Experiment. SIR RUSSELL BRAIN. The Lancet, pp. 1322–23 (Dec. 20), 1958 (London).

In his opening address, at the first Conference of the new Association for the Study of Medical Education (at the Royal College of Physicians, London, Sept. 25, 1958), Sir Russell (Physician to the London Hospital) points out the significance of the occasion, which represents, as Toynbee would say, "the conscious response to a challenge." Although medical education has been for years a concern of foundations, societies, and individuals, their activities have been rather "at the reflex level," being the whole organism only dimly aware of them. The founding of this Association, however, means that now the whole problem of medical education has emerged fully into consciousness. Although there is surely awareness of the needs, however, Sir Russell doubts that there is equal consciousness

concerning some assumptions made when talking of these needs. He thinks, therefore, that a series of questions are in order. Has education an aim? is his first. The fact, he says, that educators find it necessary to discuss so often "the aims of education" should make us suspicious. Has education, in general, been perhaps not so much pursuing an aim as looking for an aim to justify its pursuits? He believes that this has been true to a large extent for medical education. To those who argue that the aim in medical education is—for at least the last century—to insure that, before a doctor is allowed to practice, he knows enough for the public's safety, the speaker replies that "a safe doctor is not the same thing as a good doctor." This carries him to the inquiry of what is a good doctor? and the further question, good for what? To answer these queries it is necessary to decide what is the desirable scope of medical education and what should be the relationship between the basic training recognized by qualification and the more specialized skills involved alike in general practice and the specialties. However, may there not be different kinds of good doctors, and is it not possible that one kind of medical school might produce one kind and another school another kind, both equally good? If this is true, can we devise a single universally applicable test which can recognize the different varieties of goodness in the doctors produced by different educational methods? The answer seems to be that, although a doctor's training must be related to the functions he has to perform within his own particular society, variations are slight compared with the basic pattern of medical thought and practice, wherever a doctor is to work. Another question raised is that of the relationship between medical teaching and examinations. While some teachers consider examinations "a dead hand upon medical education," others have such a "pathetic faith" in them that they believe the only way to interest a medical student in their subject is to have him write an examination paper on it. Sir Russell believes that, while examinations determine the teaching, it is equally true that the teaching determines the examinations and the same people are responsible for both. One of medical education's most fundamental and difficult problems today is to decide how to divide educational emphasis between facts, skills, and the principles "which are the tools of present and future thought." This is for him the kernel of the problem. If it is true that medicine involves a large number of skills which integrate facts and principles and teaching is a skill which cannot be entirely defined in logical terms, his solution, as to the problem of the medical curriculum, is that the current approach to medical education should involve a recognized element of experimentation, designed to adapt training to a "conscious aim" and to reconcile this with the real safeguards required for the purpose of State recognition.

Physiology as an Education and as a Career. Nature, pp. 1065–67 (Oct. 18), 1958 (London).

During the joint session of Section I (Physiology, Biology, Chemistry) and Section L (Education) of the British Association and the Physiological Society (Glasgow, Sept. 3, 1958), Prof. A. V. Hill, in his introductory remarks, emphasized the need to free physiology "from the bedside attachments of its earlier years" and to allow it a status in its own right, as the interpretation of the mechanisms and integrations of normal life. Though this battle is slowly being won, much is still to be done by capturing early the imagination and interest of the young for this field. Dr. J. A. B. Gray (University College, London) also stressed the emancipation of physiology from its auxiliary position in medicine. Physiology, he points out, extends over the widest limits of the comparative field, from bacteria to man, and offers a unique opportunity for experiment and the application of physics and chemistry to the fundamental processes of all living organisms. Closer links should also be established between physiology and psychology. And while physiology must remain

an essential introduction to clinical medicine, universities should make ample provisions for courses in the faculty of science which would meet these other urgent needs. H. P. Ramage (Gresham's School, Holt) spoke on "Physiology in Schools," pointing out the present lopsided presentation of science in schools, and urging a greater awareness of the pressing need for a balanced education, not just between science and humanities, but within the field of science itself. Dr. W. Cobb (Nat. Hospital, London) discussed "Physiology in Medical Research," using the story of Berger's early pure research into changes in electrical potential on the human cerebral cortex as one of the many examples of how a piece of pure research may later have an extensive practical application. He felt that too little work in cerebral physiology is being done in Britain in order to bridge the still existing gulf between the traditional clinical observational neurologist and the modern neuro-physiologist trained in electronic techniques. Dr. D. P. Cuthbertson (Rowett Research Institute, Aberdeen), in his paper "Careers for the Physiologist in Agricultural Research," stressed the successful application of science to agriculture, on which, in his opinion, Britain's future much depends. In this application, physiology occupies a foremost place. The role of "Physiologists in Industry" was discussed by Dr. J. Yule Bogne, who pointed out that physiologists in industry are faced with two groups of questions requiring solution: (1) problems of environmental physiology (e.g., in determining the conditions in industry which make for maximal efficiency), in which group the medically trained physiologist is essential; and (2) problems which arise in the study of the effects of new products and the search for further ones, which are largely dependent on comparative physiology. Prof. D. H. Smyth (University of Sheffield), who has shown a lifelong interest in educational problems, profiled in his paper "The Training of a Physiologist" the two different types of individuals who might choose physiology as a career: the mathematically minded person and the biologically minded. While the latter is better equipped to see the real physiological problem, it is the first type who in the end would make a satisfactory analysis and offer an adequate solution.

Planning and Setting Out a Modern Medical Museum. C. A. Bozman. The Medical Press, pp. 842–45 (Sept. 3), 1958 (London).

The director of the Wellcome Museum of Medical Science, London, comments in this paper on the reasons—difficult to understand—why the medical museum, regarded for many years as an essential part of the mechanism of teaching, has not yet been developed in most medical schools as the center in which medicine can be presented as a whole to the student. Although the specialist or departmental museum is useful, it has not been recognized clearly enough, according to the author, that modern synoptic methods permit the presentation in a relatively small area of the full picture of disease in its etiological, epidemiological, pathological, clinical, therapeutic, and preventive aspects. The bases on which best to arrange such a museum (which may appeal to the student not as something to be "done" like the library, but as something to be used with pleasure and profit) and the planning and designing of it are discussed in detail and profusely illustrated by photos and drawings.

Present Day Trends in Clinical Teaching. J. R. Ellis. The Medical Press, pp. 846–50 (Sept. 3), 1958 (London).

Two distinct trends in clinical teaching can be found in Britain today: one is seen in a series of secondary changes being wrought in the established system; the other, trying to counteract these threats to traditional training, puts the emphasis on more education in the clinical years and the adaptation of training to modern conditions. The foundation of the traditional British training is the system of "Firms." The principal reason why no other country ever

adopted it might be the fact that it is based on two principles of practice which are not accepted elsewhere, namely, that specialists see only patients referred to them by other doctors, and that, under British hospital organization, each senior member of the staff has personal and permanent charge of a number of beds and clinics. The "Firm" system, according to the author (Sub-Dean of London Hospital Medical College), has been an excellent teaching method in the past, but the changes which have taken place in medicine during the last 50 years have weakened its efficiency, and changes in the British traditional teaching have been unavoidable, although slow. Over a background of *secondary* changes, various *primary* ones are being made, their scope and type varying greatly in the different schools. Four main categories of changes are seen by the author: (1) changes in the work of the "*Firm*" designed to restore it to its previous efficiency; (2) changes in the arrangement of "*Firms*" in the timetable, for the same purpose; (3) efforts to readjust the quantity and variety of clinical experience offered to the student; and (4) attempts to provide facilities for the closer study of those aspects of medicine which are now considered of greater importance than in the past. The implications of these changes for medical education are discussed in detail by the author. It is further pointed out that almost every school in the country now has its curriculum under review. The new curricula which have emerged so far all show mainly the desire for some degree of integration between pre-clinical and clinical studies and between the different aspects of clinical work. A new trend in clinical teaching is also the increasing emphasis on psychology and psychiatry which is imparted rather by each individual clinician than by intensified teaching from the departments of Psychiatry. Social and preventive medicine, taught through special departments (now in almost all medical schools) has assumed much greater importance in clinical medicine today. The last section of this paper is devoted to an examination of the changes concerning the students themselves. Students in Britain today differ from their predecessors in that many of them now come to medical schools without having previously acquired the sense of discipline and of responsibility which are more than ever necessary in medical practice. Therefore, more provision must be made for them to acquire these qualities in medical school. It is also true that students now face a more difficult task in learning medicine than former generations and that as doctors they will be required to practice medicine of much greater complexity than in the past. The safety of their future practice now depends primarily on their ability to go on learning, which, in turn, depends on the kind of education they acquire in medical school. This education, hitherto principally concerned with *training*, should in the future be less dominated by factual knowledge and pay greater attention to the individual student and to the intellectual and moral atmosphere in which he learns.

Psychiatric Problems and Preferences for Instruction. An Appraisal of Reports by 338 Practitioners. CECIL L. WITTSON, LAVERNE C. STROUGH, and JACKSON A. SMITH. The Journal of the American Medical Association, pp. 1747–50 (Nov. 29), 1958.

In order to plan more satisfactorily postgraduate courses in psychiatry for general practitioners and other non-psychiatrists, a survey of literature in this field since 1950 was made and a questionnaire mailed to over 1,200 practicing physicians to find out their interest in and attitudes toward psychiatry. The survey of publications on the subject of postgraduate courses in psychiatry for general practitioners showed that the majority of the reports were written by psychiatrists. The principal points discussed concerned problems of management of emotionally ill patients by the general practitioner and the referral of such patients to a psychiatrist. Factors influencing referral but not sufficiently emphasized were (1) the

patient's and the public's concept of a psychiatrist; (2) a lack of understanding of psychiatric terminology in consultation notes and in case presentations; and (3) the general practitioner's attitude towards psychiatry (for a detailed study of these three factors, the authors refer to J. Bingham, "What Public Thinks of Psychiatry," *Am. J. Psychiat.*, 107:599–601, 1951; K. Apple, *J. Med. Ed.*, 31:359–64, 1956, and the report of a panel discussion in *M. Times*, 85:467–74, 1954). There was general accord in the papers surveyed that the emotionally ill, or those with organic illness complicated by emotional factors, made up a sizable portion of all those patients seen in general practice. Psychotherapy with the somatically ill was considered primarily the responsibility of the physician treating the patient for his somatic disorder. The questionnaire was answered by 338 physicians. It contained inquiries on special areas of interest in psychiatry (such as physical and drug therapy; etiology; diagnosis, psychotherapy, family counseling, etc.); frequency of psychiatric problems in practice; and physicians' interest in postgraduate courses in psychiatry. Of the responding physicians, less than 2 per cent limited their practice to psychiatry and neurology, 72 per cent were in general practice, and 25 per cent in other specialties. On the questions pertaining to the special areas of interest, answers showed, as anticipated, a major interest in physical and drug therapy. It was surprising, however, to find that family counseling and etiology were of more interest than psychotherapy and that the area of least interest was, contrary to what occurred in the literature survey, "referral problems." The answers to the question about frequency of psychiatric problems in practice show marked discrepancies, since 38 per cent of those responding observed psychiatric problems in 17 per cent or less of their patients, while 17 per cent dealt with them in 88–100 per cent of their patients. As to the physicians' interest in postgraduate courses in psychiatry and neurology, only 25 per cent showed any marked interest, but 77 per cent stated they would attend them if they found them interesting. It is considered a disturbing fact that 97 per cent lacked interest in courses limited to psychiatry, with exclusion of neurology. It is suggested in the conclusions drawn from these results that problems of communication between psychiatrists and non-psychiatrists should be considered by those planning postgraduate courses, since the very slight interest in referral problems would indicate that communication between the two groups might not be altogether satisfactory.

NEW BOOKS

KENNETH E. PENROD
Book Review Editor

Reviews

To Work in the Vineyard of Surgery. The Reminiscences of J. Collins Warren (1842–1927). Edited, with Appendices, Notes, and Comments, by EDWARD D. CHURCHILL. Cambridge, Massachusetts: Harvard University Press, 1958. 288 pp. $6.00.

These edited reminiscences with appendices, notes, and comments will present the serious reader more concern than the casual explorer. Taken page by page, interest in the narrative will be broken by numerous thought-demanding notes. Thus, one will lose continuity of pleasant and important reminiscences, and forthwith turn regretfully from erudite and penetrating comment. Therefore, read the reminiscences straight through. Reread the reminiscences with emphasis upon the notes. Then, most notably, the style is lucid and eloquent. But its effortless nature belies tortured hours at writing and years of deep thought and hard labor.

For 200 years and more the Warrens of Boston have served. For a century and a half, within the milieu of Harvard University and the Massachusetts General Hospital, the dedication and accomplishments of this family have been astounding. *To Work in the Vineyard of Surgery* graciously recalls the first historic operation under ether in the Massachusetts General Hospital, which was performed by Dr. John Collins Warren, and did introduce anesthesia to the world; the era of septic surgery; and the beginnings of the contemporary period of surgery; it recounts the life of a 19th-century American medical student and contrasts this with that of one who also studied in Vienna and Berlin, studied with Virchow, Cohnheim, and Billroth; gives witness to the virility which German universities bestowed upon medical education; and describes the evolutionary transformation of Harvard Medical School from a 19th-century trade school to a 20th-century educational and scientific leader. Such events are dramatic with ordinary telling. Told simply from the records of a leader, the telling becomes inspiring.

This is no ordinary recounting. With Dr. Churchill's touch the past lives more fully in the present. *To Work in the Vineyard of Surgery*, by Edward D. Churchill, M.D. (Master surgeon and peer among scholars), will be respected for craftsmanship. For the surgical student this book can give understanding. Its greatest potential rests in the aid it may give to those who determine and direct the course of medical education. Problems are presented succinctly and pointedly. For example, "With the lengthening of hospital practice, conscious efforts have been made to convert what was formerly an apprenticeship into a true educational experience. The problem that remains is to pay these young men an adequate stipend for their service to the community during the years of intramural practice. Financially, they are still exploited as apprentices by institution, profession and community."

And, "It can be asked in a broad sense whether medicine is making the most of its university association or whether, like some individual students, it is so preoccupied with the pursuit of science on the one hand, or with practice on the other, that it is becoming deaf to the expectations and needs of society. It is said that the medical student should derive from the university community the help required to make of himself all that he is capable of being and that the university community in turn should represent a way of life which develops the power to distinguish clever and plausible workmanship from mature scholarship. What the university can offer to the individual it can do for the art as a whole—but only if medicine will look at its own limitations and seek a more complete expression of its powers by closer integration with the university community." Do read this book. Time will acclaim it!

WILLIAM P. S. PEETE

Abstracts

Fracture Surgery. A Textbook of Common Fractures. By HENRY MILCH and ROBERT AUSTIN MILCH. New York: Paul B. Hoeber, Inc., 1959. 459 pp. $17.50.

This work has been prepared in an attempt to bridge the gap between the small book of fracture management and the encylopedic volume encompassing material primarily of interest to the specialist. It makes no pretense of being either a roentgenographic atlas or a complete treatise on fractures or fracture therapy. The book is the outcome of the problems confronting the intern or resident in the emergency ward of a large hospital, when the urgent call makes a ready reference work of largely pictorial nature highly desirable. This volume is particularly planned for the medical student and the surgical house officer, those at the beginning of their study of fractures, as well as the general practitioner who does not devote full time to the treatment of fractures, and to whom a fracture is a small and frequently unexpected part of practice.

The Anatomy of the Nervous System. Its Development and Function. By STEPHEN WALTER RANSON and SAM LILLARD CLARK. 10th ed. Philadelphia: W. B. Saunders Co., 1959. 593 pp., 434 illustrations. $9.50.

The principal aim of this textbook is the same as that of the student using it: to examine not only how the nervous system is made up but as far as possible how it works. The revisions, inclusions, and alterations in this edition of this book have been made to aid the student in understanding. The references are not meant to be exhaustive but are provided as suggestions for further reading as well as to record newer information. Additions and modifications of the text and illustrations have been made in many cases as a result of suggestions from teachers and students who have observed the need as the text was used and have graciously pointed it out. The terminology that was adopted by the International Anatomical Nomenclature Committee in 1955 has been used wherever possible. Many neuroanatomical terms, however, were not included in that list, and the accepted practice has been generally the guide.

Bone Tumors. By LEWIS LICHTENSTEIN. 2d ed. St. Louis: C. V. Mosby Co., 1959. 398 pp., 220 illustrations. $12.00.

Six years have elapsed since the 1st edition of this work. As before, the emphasis is on accurate diagnosis and therapeutic indications. In this revised edition, the accrued observations and advances of the past several years have been incorporated in the subject matter presented, so that virtually every chapter has been modified to some extent. An appreciable number of new illustrations, both roentgenograms and photomicrographs, have been added. A brief introductory chapter directed to clinicians and pathologists has also been added as a guide to the appropriate management of bone lesions that may be tumors. To enhance the usefulness of the book further, a chapter on "Tumors of Periosteal Origin" has been introduced, and a discussion on "Tumors of Synovial Joints, Bursae, and Tendon Sheaths," has been added to the appendix as collateral material. Finally, in response to many requests, the discussion has been amplified in the appendix dealing with "Some Non-Neoplastic Lesions of Bone Which May Be Mistaken for Tumors."

Physical Diagnosis. The History and Examination of the Patient. By JOHN A. PRIOR and JACK S. SILBERSTEIN. St. Louis: C. V. Mosby Co., 1959. 363 pp., 193 illustrations. $7.50.

It is the firm conviction of the authors that the major objective of a course in physical diagnosis is to acquaint the student with the basic "tools of his trade," namely, the history, physical examination, and essential medical terminology. The emphasis on history-taking in this text is considerably greater than is usually the case in similar texts. There is a relatively detailed discussion of the review of body systems. This has been done primarily to aid the student in learning new terminology by a conscientious effort to explain the meaning of the technical terms employed. Discussion of disease has been kept intentionally at a minimum, because, first, it is felt that a thorough concept of the normal is essential to the appreciation of the abnormal and, second, the mere volume of the material presented to the student today in most textbooks of physical diagnosis is itself overwhelming.

Manual of Differential Diagnosis. By WILLIAM C. MATOUSEK. Chicago: The Yearbook Publishers, Inc. 352 pp. $8.00.

The objective of this book has been to present an integrated differential diagnosis of selected symptoms and signs in a telegraphic style. The book is most likely to be used in the analysis of individual cases, the reader referring to specific topics for guidance. The arrangement and presentation present an on-the-spot check of a diagnostic problem. Immediate reference is

encouraged by the brief but comprehensive coverage as well as the significant organization of each topic.

The Middle Ear. By HEINRICH G. KOBRAK. Chicago: University of Chicago Press, 1959. 242 pp. $15.00.

Some six collaborators have contributed to this book: a physiologist, an audiologist and four surgeons. The book is written by physicians for physicians, and in a sense reflects a retreat from the classical acoustic studies published by non-physicians who approached the problems of the ear with methods, mathematics, and somatics which were frequently incomprehensible to the practicing otologist. Results were given in curves more abstract than physicians are accustomed to, and functional findings were sometimes too minute and meaningless for a physician's use. This book deals with the basic descriptive sciences as they appear to be necessary for an understanding of the function of the middle ear in health and disease. Anatomy and physiology are the pillars on which the clinicians' diagnosis and treatment rest. Special emphasis has been put on clinical and surgical observations.

Psychology: A Study of a Science. Study I. Conceptual and Systematic. Vol. I. Sensory, Perceptual and Physiological Formulations. Edited by SIGMUND KOCH, with 13 contributors. New York: McGraw-Hill Book Company, Inc., 1959. 685 pp. $9.75.

The American Psychological Association, with help from the National Science Foundation, has sponsored a 7-volume treatise addressing itself to the fundamental nature of psychology. This is the first volume of the projected series. In the series, the first 3 volumes, which bear the collective title "Study I. Conceptual and Systematic," are concerned with many of the systematic formulations and recent and current influences which psychologists have developed to account for the phenomena in which they are interested. Each systematic position is analyzed by its originator, or a person connected with its development, in a role which gives attention to the problems it seeks to solve, the empirical basis on which it rests, its degree of success, and its relation to other formulations. A second set of 3 volumes, collectively called "Study II. Empirical Substructure and Relations with Other Sciences" inquires, again through the efforts of creative active investigators, into the organization of the various fields of empirical knowledge, the relations of one to another, and to work going forward in other sciences. It also examines such problems in reverse through the participation of social and biological scientists who consider the relations of their own special fields to various parts of psychology. The 3 volumes of Study II, now in preparation, will be published at a later date. Volume VII—"Psychology and the Human Agent"—will present the study director's view of certain problems of psychological inquiry in the light of the findings of the project. In all the finished treatise will represent the cooperative effort of approximately 80 authors, whose original papers constitute the basic material of the series.

Operational Values in Psychotherapy. A Conceptual Framework of Interpersonality. By DONALD D. GLAD. New York: Oxford University Press, 1959. 318 pp.

The author has attempted here to consider some significant value systems which are conceptualized in psychotherapy theory and to describe their operational dimensions. Four such value systems are expressed in operational form: psychoanalysis, interpersonal psychiatry, dynamic relationship therapy, and client-centered phenomenology fitted to an operational structure. The value systems of clients and patients are examined in cognate terms, to the end that effective changes in behavior may be expressed as an interaction of interviewer and client values. The book is intended to be a preliminary engagement between science and art in the production of useful values and behavior. It is meant as a tentative answer to an essential question in psychotherapeutic science: "In what ways are the values of psychotherapy amenable to operational definition and application?"

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NEWS FROM THE MEDICAL SCHOOLS

Albany

Dr. HAROLD C. WIGGERS, dean of the medical college, has returned from a two-week inspection tour of five medical schools in Ireland. The tour was sponsored by the Board of Regents of the State of New York for the purpose of evaluating the schools' medical graduates in relation to their eligibility for licensure examinations in New York State. The survey was conducted at the invitation of the Irish Government and included University College, Cork; University College, Royal College of Surgeons, and Trinity College, Dublin; and University College, Galway.

Baylor

Dr. WALTER H. MOURSUND, Sr., dean emeritus of Baylor University College of Medicine, died April 2, after an illness of three months. Dr. Moursund joined the faculty in 1911 and after a series of promotions, became dean in 1923. He retired in 1953, having served 30 years as dean.

British Columbia

President N. A. M. MACKENZIE announced the appointment of Dr. JOHN F. MCCREARY as dean of the faculty of medicine, effective April 1. He succeeds Dr. JOHN PATTERSON, who resigned in September 1958, to become dean of medicine at Vanderbilt University.

Dr. McCreary

Dr. McCreary, who received his medical degree from the University of Toronto in 1934, came to British Columbia in 1951 as head of the paediatrics department of the university's newly formed medical school. The same year he was named paediatrician-in-chief of the Health Centre for Children.

As a wing commander with the Royal Canadian Air Force from 1942 to 1945, Dr. McCreary acted as a consultant in nutrition and in 1944 was detached to SHAEF headquarters in Europe to carry out examinations of more than 50,000 children in liberated areas of Europe. In recognition of his work, the Netherlands government awarded him one of its distinguished decorations and named him an Officer in the Order of Orange-Nassau.

Upon his appointment as dean, Dr. McCreary resigned as head of the department of paediatrics but will remain as a professor in that department.

University of Chicago

A special unit to study the long-range impact of nuclear energy on public health matters has been set up at the University of Chicago School of Medicine with an initial grant of $500,000 from the Rockefeller Foundation. Dr. JOHN HOWARD RUST, presently project director, department of food technology, Massachusetts Institute of Technology, will head the newly established Section on Nuclear Medicine. In announcing his appointment, Dr. LOWELL T. COGGESHALL stated that Dr. Rust's section would deal with the full range of nuclear energy public healths—"from atmosphere to zoology."

Columbia

Dr. ROBERT F. LOEB will retire June 30, as chairman of the department of medi-

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cine. He will also relinquish his post as director of the Medical Service of Presbyterian Hospital. He will remain Bard Professor of Medicine at Columbia for another year while on sabbatical leave.

Joining the faculty in 1921, Dr. Loeb became the first Lambert Professor of Medicine in 1942. In 1947 he was appointed Bard Professor of Medicine, executive officer of the department and director of the Medical Service at Presbyterian Hospital.

Duke

Duke University has announced plans to erect a $776,000 building to house the university's regional center for the study of aging. Providing facilities for a broad attack on the problems of aging, the structure will be financed in part by a $338,000 grant from the National Institutes of Health. The new building will provide space for aging studies by researchers in medical, biological, social and behavioral sciences.

Major expansion of radiation treatment and research facilities were scheduled to begin at the medical center in April. Providing a "cobalt 60" therapy unit, the project will include extensive new facilities for X-ray and radium treatment. Total cost of construction and equipment will be approximately $375,000. The North Carolina Medical Care Commission has allotted $193,333 to the project.

Georgetown

Ceremonies were held recently dedicating the new $3 million Lawrence C. Gorman Diagnostic and Research building and the $1,227,000 Kober-Cogan dormitory for medical and dental students.

A memorial to the late Lawrence C. Gorman, S.J., president of Georgetown University from 1942 to 1949, the Diagnostic and Research building adjoins the existing Georgetown University Hospital building. Dentistry and nursing, as well as medicine will be housed in the new building.

The Kober-Cogan dormitory houses 200 students and is located in the university's medical center area. The building honors the memory of Dr. George M. Kober, who served as dean of the school of medicine from 1900 to 1929, and Dr. William N. Cogan, first dean of the school of dentistry.

Hahnemann

Dean CHARLES S. CAMERON has announced the appointment of Dr. HARRY J. HURLEY, Jr. as professor of dermatology. A graduate of Jefferson Medical College, he has taught at the Boston University School of Medicine and the University of Pennsylvania's School of Medicine and Graduate School.

Harvard

Dr. C. SIDNEY BURWELL will become Levine Professor of Medicine, Emeritus on August 31, bringing to a close 40 years of academic life. Simultaneously he will retire as physician to the Peter Bent Brigham Hospital and as visiting physician at the Boston Lying-in Hospital.

Following his official retirement, Dr. Burwell plans to occupy an office in the administration building of the medical school. where he will engage in writing the history of the Harvard Medical School.

Illinois

Dr. ADOLPH ROSTENBERG, Jr. has been named head of the department of dermatology, effective May 1. Dr. Rostenberg, who is also a professor of dermatology, has been serving as acting head since the resignation of Dr. MARCUS R. CARO last September.

Indiana

Dedication ceremonies for the new Medical Science building were held April 21–23. Providing facilities for basic science instruction in anatomy, biochemistry, microbiology, pathology, pharmacology, and physiology, the new structure represents a total expenditure for land, construction, and equipment of $7,352,000.

Jefferson

WILLIAM W. BODINE, Jr. has taken office as president-elect of Jefferson Medical

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College and Medical Center. On June 30, he will succeed Admiral JAMES L. KAUFFMAN, U.S.N. (ret.), who resigned March 2. Admiral Kauffman has been president since 1949.

Described as "one of the most public-spirited leaders in the city" when selected the Young Man of the Year by the Junior Chamber of Commerce of Philadelphia in 1950, Bodine, now 40, has served on the boards of 14 institutions and organizations in greater Philadelphia. Prior to his appointment at Jefferson, he was financial secretary of the Penn Mutual Life Insurance Company.

Mayo Foundation

Dr. GILES A. KOELSCHE, assistant professor of medicine and consultant in medicine in the Mayo Clinic, was named president-elect of the American College of Allergists at the 15th annual meeting of the organization on March 18.

Medical Evangelists

Dr. PAUL D. FOSTER was named president-elect of the California Medical Association at a recent meeting of the organization in San Francisco. Dr. Foster is professor of dermatology at the college.

Michigan

Dr. ROGER W. HOWELL will join the University of Michigan School of Public Health in July, as the first full-time psychiatrist in the school's history. His appointment as associate professor of public health administration was recently approved by the Board of Regents of the university. Since December 1956, Dr. Howell has been director of preventive psychiatry at the Lafayette Clinic in Detroit, and associate professor of psychiatry at Wayne State University. Previously he had taught at the universities of Minnesota and North Carolina.

Missouri

Dr. ROSCOE L. PULLEN has resigned his position as dean of the University of Missouri School of Medicine and as director of the University Medical Center. He will continue on the faculty as professor of medicine on returning from a leave of absence. In accepting Dr. Pullen's resignation, President Elmer Ellis stated, "the university and the State of Missouri are both deeply indebted to him for his brilliant and successful leadership in building the University of Missouri Medical Center and in the recruitment of the excellent staff for its operation."

Dr. GWILYM S. LODWICK, professor of radiology, has been appointed acting dean and will exercise the authority of the dean and director until a new dean is selected.

North Carolina

Dr. CHARLES H. BURNETT, professor and head of the department of medicine, left recently for a seven-week lecture and study tour of medical centers in Puerto Rico and five South American countries. Sponsored by the Rockefeller Foundation, the tour is related to the program of general development for the department of medicine.

Pennsylvania

Dr. GEORGE B. KOELLE, dean of the graduate school of medicine and chairman of its department of physiology and pharmacology, has been elected chairman of the department of pharmacology in the university's school of medicine, effective July 1. He will continue temporarily to serve as dean of the graduate school of medicine and will retain responsibility for teaching of pharmacology there.

Dr. Koelle succeeds Dr. CARL F. SCHMIDT, who will attain emeritus status at that time, after 28 years as professor and chairman of the department. Dr. Schmidt will continue in many of his professional activities, including serving as editor of *Circulation Research*, one of the scientific journals of the American Heart Association.

Rochester

Dr. WILLIAM D. LOTSPEICH, who has been chairman of the physiology department

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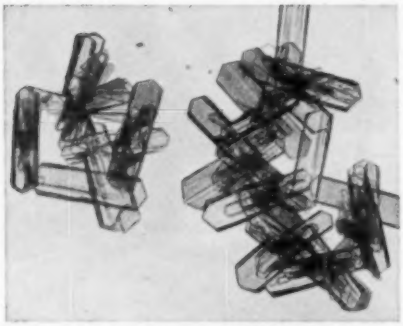

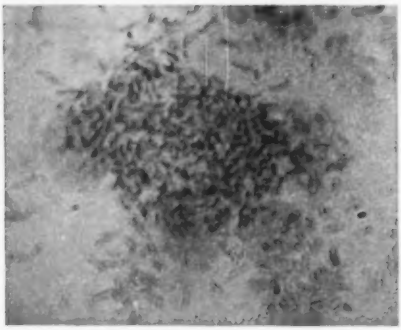

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at the University of Cincinnati College of Medicine since 1951, will join the faculty of the University of Rochester School of Medicine and Dentistry as chairman of its department of physiology on July 1. He succeeds Dr. WALLACE O. FENN, who has headed the department since 1924. Dr. Fenn is retiring from the chairmanship, but will continue as professor of physiology.

Saint Louis

A Saint Louis University School of Medicine scientist, who recently has been attached to the space project at Cape Canaveral, has invented a pocket sized radar and microwave detector, which is currently being used by members of the Armed Forces as a safeguard against radiation.

Dr. ALFRED W. RICHARDSON, associate professor of physiology, presented the device, called the Richardson dosimeter, before a conference attended by other space project consultants at Cape Canaveral, Fla. He was assigned to the space project in January.

Seton Hall

The appointment of Dr. CHRISTOPHER M. MARTIN as assistant professor of medicine and director of the division of infectious diseases of the department of medicine has been announced by Dean CHARLES L. BROWN. Dr. Martin has been an assistant in medicine at Harvard for the past two years. Simultaneously, he has been a research fellow in the infectious disease unit of the Thorndike Memorial Laboratory at Boston City Hospital.

Stanford

With a grant of $255,000 from the Russell Sage Foundation, a new teaching and research program that combines social sciences with medicine will be established next fall when the medical school moves into its new $20 million center on the campus. The grant will provide basic support for the first five years, with Professor EDMUND H. VOLKART of the sociology department directing the program during its first year. Emphasis will be placed on inter-departmental teaching and research. According to Professor Volkart, "our intent is not to make social scientists out of medical students, or to convert social scientists into physicians, but we do think that those with skill in both fields can make significant contributions to our knowledge of illness and its treatment."

S.U.N.Y. Brooklyn

An Hungarian-born psychoanalyst belonging to the first generation of the Freudian school was guest of honor recently at a dinner celebrating the 10th anniversary of the teaching of psychoanalysis at the Downstate Medical Center in Brooklyn. Over 200 persons, including faculty and students of the medical center and members of the Psychoanalytic Association of New York, were present to pay tribute to Dr. Sandor Lorand, clinical professor of psychiatry and founder and director of the division of psychoanalytic education at the university's medical center.

Former and present students of Dr. Lorand announced the establishment of an annual Sandor Lorand Essay Award, "to further honor a respected and devoted teacher and to perpetuate the effects of the enthusiasms he has aroused in his students." The award will go to the candidate who presents the best paper during the year before the Psychoanalytic Association of New York.

Vanderbilt

Dr. DAVID E. ROGERS, associate of medicine at Cornell University and chief of the division of infectious disease, New York Hospital-Cornell Medical Center, has been named professor and head of the department of medicine at Vanderbilt. His appointment will take effect at the beginning of the 1959–60 academic year. Since the retirement last June of Dr. HUGH J. MORGAN, the department has been directed by a committee, of which Dr. RUDOLPH H. KAMPMEIER is chairman.

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University of Virginia

Dr. ALBERT J. PAQUIN, Jr. has been appointed professor of urology and chairman of the department, effective May 1. Dr. HUGH WARREN, associate professor of urology, has served as acting chairman since the death of Dr. SAMUEL A. VEST, Jr. last year.

Prior to his appointment at Virginia, Dr. Paquin served on Cornell University's faculty of medicine as associate professor of clinical surgery and urology, and was associate attending surgeon in urology at the New York Hospital-Cornell Medical Center.

University of Washington

Authorization has been granted the school of medicine to offer a degree of bachelor of science in occupational therapy. The new curriculum will provide training for students in the use of mental and physical activities as a remedial treatment for patients with disabilities.

To be inaugurated next autumn, the degree will be awarded under the department of physical medicine and rehabilitation.

Wayne State

A consulting and diagnostic service for multiple sclerosis patients has been established at the college of medicine with funds provided by a grant from the Michigan Chapter of the National Multiple Sclerosis Society. Under the direction of Dr. JOHN T. MCHENRY, the neurology department will provide neurological supervision and clinical evaluations for the referring physician. Physical therapy and related treatments will be administered at the Rehabilitation Institute of Metropolitan Detroit and other community rehabilitation agencies.

Research projects into the cause of multiple sclerosis will also be conducted by the department of neurology.

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Truex: STRONG AND ELWYN'S HUMAN NEUROANATOMY

"The text material in the present revision was . . . rearranged, grafted, and pruned. . . . Major changes were incorporated in Chapters I and XIII, while minor revisions were made in each of the remaining chapters. It is imperative that the student acquire an appreciation of the gross aspects of the brain and spinal cord, as well as knowledge of their blood supply, early in the course of study. Such information has been assembled in two new chapters (IV and V). The rhinencephalon and olfactory pathways were elevated to chapter status. . . . Alterations were dictated largely by student use and comprehension of the text, in the lecture hall, laboratory, and subsequent clinical courses. Thus, a conscientious effort was made throughout this revision to maintain Professor Elwyn's original objective, namely, to keep this volume a 'student textbook.' . . . 37 new illustrations have been added. Twenty-three are in color. The highly schematic, and often greatly enlarged, diagrams of major nervous pathways were designed to provide visual continuity through different levels of the central and peripheral nervous system. . . ."—*From the Preface*

CONTENTS—Origin and composition of the nervous system. Development of the nervous system. Meninges of the central nervous system. Gross considerations of the central nervous system. Blood supply of the central nervous system. The neuron. Neuroglia, the interstitial tissue of the nervous system. Histogenesis of the neural elements and their segmental distribution. Peripheral nerves and their ganglia. Peripheral terminations of afferent and efferent nerve fibers. Segmental and peripheral innervation. Internal structure of the spinal cord. Fiber tracts of the spinal cord. Peripheral portions of the autonomic system. Internal structure of the medulla. Internal structure of the pons. The mesencephalon. Internal structure of the cerebellum. The diencephalon and corpus striatum. The rhinencephalon and olfactory pathways. The cerebral cortex.

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ITEMS OF CURRENT INTEREST

International College of Surgeons Sponsors World Tour

The International College of Surgeons will hold its fourth around-the-world postgraduate refresher clinic tour in the late Fall. Dr. Edward L. Compere, president of the United States Section, I.C.S., will be coordinator of the medical activities.

Departure will be by plane from San Francisco, Oct. 10. The tour participants will take in specially arranged meetings of I.C.S. Sections in Tokyo, Oct. 18–19; Hong Kong, Oct. 29–30; Bangkok, Nov. 2; Tel Aviv, Nov. 20; Istanbul, Nov. 24, and Athens, Nov. 27.

Further information may be obtained by writing to the Secretariat, International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Ill.

Dr. Bayne-Jones Honored

Dr. Stanhope Bayne-Jones has been selected as recipient of the $5000 Passano Award for 1959, "in recognition of a long and extraordinary service to science and medicine as educator and administrator in tasks of the highest importance, in all of which he has served with distinction and faithfulness." Now in private practice, Dr. Bayne-Jones most recent post was that of chairman of the Secretary's Consultants on Medical Research and Education, Department of Health, Education, and Welfare.

On Wednesday evening, June 10, during the convention of the American Medical Association in Atlantic City, a reception and dinner will be held at the Traymore Hotel to honor him. Dr. Louis M. Orr, incoming president of the AMA, will speak on Dr. Bayne-Jones' contribution to the practice of medicine, and Dr. Joseph C. Hinsey, Director, New York Hospital-Cornell Medical Center, will present his contribution to medical education.

The Passano Foundation was formed late in 1943, having as its sole purpose the encouragement of medical science and research, particularly that having a clinical application. It is sustained by annual contributions from the Williams and Wilkins Company, publishers of medical and scientific books.

Pharmaceutical Manufacturers Hold Meeting

"New governmental interest in our affairs makes it important that our association and top management of every company in the industry insist upon rigid standards of self-imposed discipline at all levels and in all facets of our promotion," declared William B. Graham, newly elected chairman of the Pharmaceutical Manufacturers Association. Addressing members of the industry at their annual meeting in Boca Raton, Fla. on April 3, Graham further asserted that "we must do everything we can, as an association and as individuals, to advance, not hinder our growth and thus insure continued service to our various publics."

Graham, who is president of Baxter Laboratories, was named chairman of the Board of Directors, and Dr. Austin Smith, former editor for the American Medical Association, was named first full-time salaried president of the Pharmaceutical Manufacturers Association. Since 1953, Dr. Smith has been executive editor of the *World Medical Journal* and since 1954 has served as chairman of the board of the U.S. Committee, World Medical Association.

Harry J. Loynd, president of Parke, Davis & Company, was designated as chairman for 1960.

Important Book Announcement

FROM YEAR BOOK PUBLISHERS

For MEDICAL EDUCATORS and THEIR STUDENTS

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Hoffman's BIOCHEMISTRY OF CLINICAL MEDICINE

New 2nd Edition, Just Published—The highly readable character of this text has made it a favorite of both teachers and students. Each description of biochemical knowledge is orderly and to the point; the application to diagnosis, prognosis and therapy clear and precise . . . For the New 2nd Edition, a wealth of new material has been added and all chapters brought in step with current knowledge. If you have not used the first edition in your course, close examination of the New 2nd Edition is recommended. By WILLIAM S. HOFFMAN, PH.D., M.D., *Professorial Lecturer in Medicine, University of Illinois.* 756 Pages; Illustrated. $12.00

Randall's ELEMENTS OF BIOPHYSICS

This recently published text is offered as a tested teaching tool for grounding the student in the concepts of biophysics basic to the study and practice of modern medicine. Dr. Randall has organized and developed his material in such a way as to lead the reader easily through the quantitation process, the integration of forces and energies associated with masses, electric charges and electromagnetism, and finally into a delineation of nuclear energy. By JAMES E. RANDALL, B.S.E.E., M.S., PH.D., *Associate Professor of Physiology and Biophysics, University of Missouri Medical Center.* 330 Pages; Illustrated. $8.00

Kjellberg's DIAGNOSIS OF CONGENITAL HEART DISEASE

New 2nd Edition—There is no other volume of the scope and background of this distinguished authority. For the New 2nd Edition, four new chapters and more than 400 new illustrations have been added. Case material has been almost doubled. All of the advances in this important field are taken up. Medical education is fortunate, indeed, to have such a source of reference. By SVEN ROLAND KJELLBERG, EDGAR MANNHEIMER, ULF RUDHE and BENGT JONSSON, *the Cardiac Team at the Pediatric Clinic, Karolinska Sjukhuset, Stockholm.* Approx. 800 Pages; Over 2200 Illustrations on 727 Figures. Ready Soon. Approx. $25.00

Singleton's X-RAY DIAGNOSIS OF THE ALIMENTARY TRACT IN INFANTS AND CHILDREN

New—Examination of this book is a rewarding experience. Although basically a text on x-ray diagnosis, it is deeply concerned with the total diagnostic approach. The descriptions of symptomatology are classic; the delineation of clinical findings all-inclusive. Anatomy, embryology, physiology and indications for radiologic examination are superbly integrated. Dr. Singleton uses clear-cut portrayals of the normal as the foundation for recognition of the abnormal; points out the variations in findings at various age levels. The 380 illustrations on 215 figures are quickly appreciated at a glance. By EDWARD B. SINGLETON, M.D., *Director of Radiology, Texas Children's and St. Luke's Hospitals, Houston.* 352 Pages; 380 Illustrations on 215 Figures. $11.00

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World Medical Association Names Officers

Dr. Renaud Lemieux of Quebec, Canada, was recently elected President-Elect of the World Medical Association for the term 1958–59. Dr. Lemieux, professor of medicine at Laval University and recent past president of the Canadian Medical Association, was nominated to fill the vacancy resulting from the untimely death of the incumbent, Dr. Leon Gerin Lajoie of Montreal, Canada.

Dr. John M. Bishop has been appointed Deputy Secretary General of the Association, effective May 1. He served several years in the Public Health Service, resigning in 1957, with the grade of Senior Surgeon (Lt. Colonel). During his Public Health Service career Dr. Bishop had extensive service in Europe as consultant and supervisor of medical activities. Following his resignation from the U.S.P.H.S., Dr. Bishop entered private practice in Bellevue, Wash.

MEND News

On March 4–6, a MEND-sponsored symposium on "Medical Operations and Research in Climatic and Environmental Extremes" was presented by the U.S. Naval Medical School at Bethesda, Md. The second of five symposia to be conducted under MEND auspices during the current academic year, this teaching program attracted a total of 100 participants, 76 of whom were from the colleges of medicine. The remaining 24 represented the Federal agencies.

The 1959 MEND Orientation Tour for deans, MEND coordinators, and faculty members of recently-affiliated schools took place during the period March 18–26. Among the 31 participants in the tour were Deans E. Harold Hinman (Puerto Rico); John S. Hirschobeck (Marquette); Norman B. Nelson (Iowa); Daniel T. Rolfe (Meharry); and John D. VanNuys (Indiana). The tour, which included visits to Navy activities in the San Diego, Calif., area and to Army and Air Force installations in San Antonio, Texas, and vicinity, was conducted for the purpose of orienting faculty members of schools new to the MEND Program to medical and operational responsibilities of the Armed Forces.

New Training Program for Medical Researchers

A new type of training program for medical researchers, the first of its kind, has been announced jointly by officials of the New England Center Hospital and the Massachusetts Institute of Technology. A grant of $146,000 has been made by the National Heart Institute of the National Institutes of Health to the New England Center Hospital, which includes the Pratt Diagnostic Clinic, to establish a three-year training program in cooperation with M.I.T. for clinical scientists in the field of cardiovascular and pulmonary research. The program will be under the direction of Dr. Samuel Proger, physician-in-chief of the New England Center Hospital and professor of medicine at Tufts University School of Medicine. In direct supervision will be Dr. Leon Cander, who heads the hospital's pulmonary physiology laboratories. Developed by Dr. Cander in conjunction with Dr. Irwin W. Sizer, chairman of the department of biology at M.I.T., the program will enable six qualified physicians to further their training in medical investigation.

Isn't it time to take the curse off menstruation?

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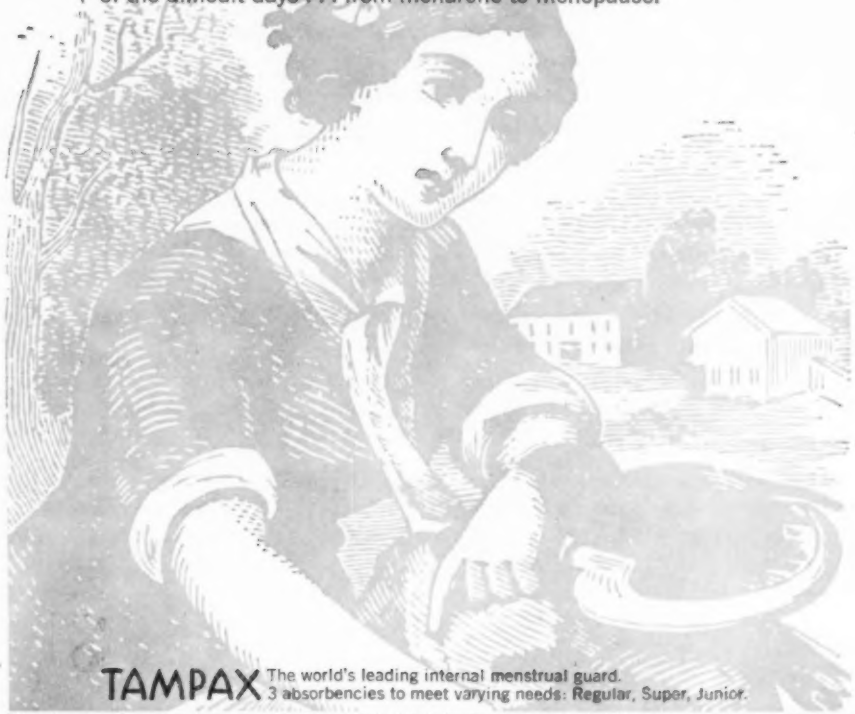

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Tampax Incorporated, Palmer, Mass. 1. Novell, H. A.: Obst. & Gynec. 10:213, 1957. 2. Bernstine, J. B., and Rakoff, A. E.: Vaginal Infections, Infestations and Discharges, New York, The Blakiston Co., Inc., 1953. 3. Janney, J. C.: Medical Gynecology, Philadelphia, W. B. Saunders Co., 1950. 4. Karnaky, K. J.: Clin. Med. 3:545, 1956.

ABSTRACTS ON PROGRAMS OF MEDICAL EDUCATION FOR ANNUAL MEETING OF THE ASSOCIATION

The annual meeting of the Association of American Medical Colleges will be held at the Edgewater Beach Hotel, Chicago, Illinois, on November 2 to 4, 1959.

The Program Committee will welcome abstracts describing experiments and programs in medical education and in health services related to medical education. This may include methods of education and of research, for the premedical, medical, graduate, and postgraduate years. Since educational projects are inherently long-term in nature, abstracts describing programs either projected or in progress will be considered.

The following regulations concerning abstracts and presentation of papers have been approved by the Program Committee and the Editorial Board of *The Journal of Medical Education:*

1. Three copies of each abstract are required, to be sent to the Chairman of the Program Committee, in care of Dr. Ward Darley, Association of American Medical Colleges, 2530 Ridge Avenue, Evanston, Illinois.

2. Abstracts should be postmarked no later than June 1, 1959.

3. No author may submit more than two abstracts, one as senior and one as assistant author.

4. Abstracts should be no longer than 250 words; no tables, charts, or references should be included. The title of the paper should be followed by the names of the authors, their faculty rank, their university, institute or hospital, and its location. Abstracts must be typewritten, double-spaced, on 8½ by 11-inch bond paper.

5. The time allowed for presentation of any paper will be 15 minutes. Projectors will be provided for lantern slides $3\frac{1}{4} \times 4$ inches or 2×2 inches.

6. Abstracts accepted by the Program Committee for presentation or to be read by title will be published in the October issue of the *Journal of Medical Education.* Copies of the abstracts will be available for sale at the time of the meeting.

The formal paper will be considered for publication by the Editorial Board of the *Journal of Medical Education;* if authors so desire, the full-length paper, prepared according to Instructions to Authors, published in the Journal, should be submitted to the Editorial Office, Journal of Medical Education, University Hospitals, University of Wisconsin, Madison 6, Wisconsin.

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PERSONNEL EXCHANGE

Faculty Vacancies

VIROLOGIST and IMMUNOLOGIST: Research position in medical school for young Ph.D. interested in immunology and virology to cooperate in a research program as well as to pursue individual interests. Salary depends upon qualifications and experience. Opportunity for teaching. Address: V-73.

PSYCHIATRIC SOCIAL WORKERS: Active participation in clinical teaching and in expanding program of services in the department of psychiatry and in pediatrics-psychiatry clinic in eastern university medical school. Excellent opportunity for individuals interested in social work contribution in medical education. Qualifications: Master's degree with psychiatric sequence, and for senior positions experience in supervision or teaching, preferably in psychiatric clinical setting. Send curriculum vitae with application. Address: V-74.

PHYSIOLOGIST OR PHARMACOLOGIST: Teaching and research position in medical school. N.Y.C. area. M.D. or Ph.D. required. Training in neurophysiology desired. Salary based on qualifications and experience. Address: V-75.

PROFESSOR OF PREVENTIVE MEDICINE: The University of Alberta invites applications for the position of professor and head of the department of preventive medicine in the faculty of medicine. Duties will include administration of the department, teaching of graduate and undergraduate students and a program of research. Salary will be $10,000 per annum with consulting privileges. Interested applicants should send a complete curriculum vitae, names of three referees, and a recent photograph to the office of the Dean of Medicine, University of Alberta, Edmonton, Alberta.

PEDIATRICIANS: Two or 3 part-time teaching positions —may use remainder of time for private practice. Address: F. G. Gillick, M.D., Creighton University School of Medicine, Omaha 2, Nebraska.

PSYCHIATRISTS: Full-time and part-time teaching positions. Need coordinator of teaching grant program. Would function under departmental director. Address: F. G. Gillick, M.D., Creighton University School of Medicine, Omaha 2, Nebraska.

ASSISTANT PROFESSOR OF PREVENTIVE MEDICINE: Full-time appointment in department of preventive medicine with teaching and research opportunity, including comprehensive medical care teaching. Must have M.P.H. degree. Address: V-76.

FELLOW IN VIRUS RESEARCH: M.D., with at least one year of residency in pediatrics for training in diagnostic virology. Duties include approximately three hours of ward rounds, and five hours of training and research in the virus laboratory. The individual is expected to direct and consolidate activities in the clinical and research areas. Salary $6,000 per annum. Position available for 2-year tenure. Apply Dr. H. A. Wenner, University of Kansas Medical Center, Kansas City, Kansas.

IMMUNOCHEMIST OR BIOCHEMIST: Must be interested in field of infectious diseases. Activities include studies on immune mechanisms and on the biochemistry of virus infections. Full-time research position. Salary open; minimal $8,000. Apply H. A. Wenner, M.D., Section for Virus Research, University of Kansas School of Medicine Kansas City, Kansas

PSYCHIATRISTS: Newly organized department of psychiatry in east coast medical school needs full-time psychiatrists for research and teaching. Rank and salary are dependent on experience and qualifications. Address: V-77.

DIRECTOR OF MEDICAL EDUCATION: for new 350-bed hospital. New position. Internal medicine specialist preferred for full-time position. Beginning salary about $15,000 per year. Address inquiries to: Sister Administrator, Providence Hospital, Washington 17, D.C.

PHARMACOLOGIST: The University of Alberta invites applications for the position of Associate Professor of Pharmacology, effective not later than September 1, 1959, at a minimum salary of $8,000 per annum, with annual increments. Duties include undergraduate and graduate teaching and a program of research. Applicants possessing a medical degree, in addition to qualifications in pharmacology, will be given preference. Applications should include a recent photograph or snapshot, a curriculum vitae, and the names of three references, and should be sent to the Dean of Medicine, University of Alberta, Edmonton, Alberta, Canada.

PSYCHIATRIC SOCIAL WORKER: Position open on new child psychiatry inpatient service to be opened on July 1. Research and teaching will be emphasized in developing program. Preferred qualifications are Ph.D. degree or doctoral candidate with solid clinical grounding in psychiatric social work. Master's degree in Social Work with 5 years psychiatric clinical experience will be considered. Position carries academic appointment. Send curriculum vitae with application. Address: V-78.

PHARMACOLOGIST: Full-time appointment in department of pharmacology for assistant professor of pharmacology. Ph.D. or M.D., preferably the latter, and previous training in pharmacology required. Salary $7,000 or higher according to qualifications. Interested candidates should send a complete curriculum vitae and recent photograph to Dr. M. F. Murnaghan, Professor and Head, Department of Pharmacology, University of Ottawa, Ottawa 2, Ontario, Canada.

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To aid in solution of the problem of faculty vacancies, MEDICAL EDUCATION will list persons and positions available, as a free service. The school department or person may have the option of being identified in these columns or of being assigned a key number for each position listed. Mail addressed to key numbers will be forwarded to the person or department listing the request.

Information for these columns should reach the Personnel Exchange, Journal of Medical Education, 2530 Ridge Avenue, Evanston, Illinois, not later than the 10th of the month which precedes the month in which the listings will appear.

Personnel Available

PHYSIOLOGIST: Ph.D., 1958, married, three children. Research in circulatory and respiratory physiology. Nine publications; teaching experience with medical and dental students. Desires teaching appointment in New England or New York State, with opportunity for research. Address: A-381.

INTERNIST: Female, age 32; Mayo trained with an interest in hematology. Desires teaching position. Address: A-383.

SURGEON: Age 33, certified general, experience in thoracic and extra-corporeal techniques. University training. Seeks full-time academic position with opportunity for research. Address: A-384.

BIOSTATISTICIAN: Seeking position as member of team in basic medical research or as lecturer to medical, dental, pharmacy and graduate students. Address: A-385.

PEDIATRICIAN: MPH, desires teaching and/or research position with clinical emphasis. Address: A-386.

ANATOMIST: Position wanted in university anatomy department in U.S., by married male with family. British medical school degree in medicine, extensive clinical experience, and recent teaching and research experience in anatomy in England. Good references available. Available to attend interviews in the U.S. now. Address: A-387.

OBSTETRICIAN-GYNECOLOGIST: Foreign physician, age 30, three years residency in obstetrics and gynecology in teaching hospitals of U.S.A., with good command of English, desires position as preceptor in Ob-Gyn., starting July 1959. Address: A-389.

UROLOGIST: Foreign physician, age 30, one year internship, three years in urology and one in urological research in teaching hospitals of U.S.A. Desires position as preceptor in urology, starting July 1959. Good command of English. Address: A-390.

THORACIC SURGEON: M.D. 1947, University of Istanbul. Served an internship in surgery (1954–55) Montana Deaconess Hospital, Great Falls, Montana. Served as Fellow in Thoracic Surgery (sponsored by American College of Chest Physicians) Knoxville, Tenn. Presently in charge of thoracic surgery department at Armenian Hospital, Istanbul. Desires teaching position in American medical school. Address: A-391.

PATHOLOGIST: Age 35, married. Certified PA 1955. Academic background and three years teaching experience. Wishes to relocate in West. Will consider part-time or full-time teaching appointment. Especially interested in surgical pathology. Address: A-392.

OTOLARYNGOLOGIST and HEAD and NECK SURGEON: Age 32; board eligible. University of the Philippines graduate. Completed five and one half years' training in eastern medical centers (3 years otolaryngology, 6 months more bronchoesophagology, and 2 years general and head and neck surgery). Desires one year fellowship, or assistantship, or academic position. Available August or October, 1959. Address: A-393.

BIOCHEMIST: Ph.D., age 30. Assistant professor of biochemistry desires academic position. Five years medical and graduate teaching experience. Membership in national societies, honors, grants, graduate students. Fifteen full-length publications. Research interests: enzymology, microbial metabolism and protein metabolism. Available July 1, 1959. Address: A-394.

PHYSIOLOGIST-PHARMACOLOGIST: Ph.D., 1954. Male, married, with family. Presently teaching physiology in dental school. Desires teaching position with research opportunities in physiology or pharmacology department. Address: A-395.

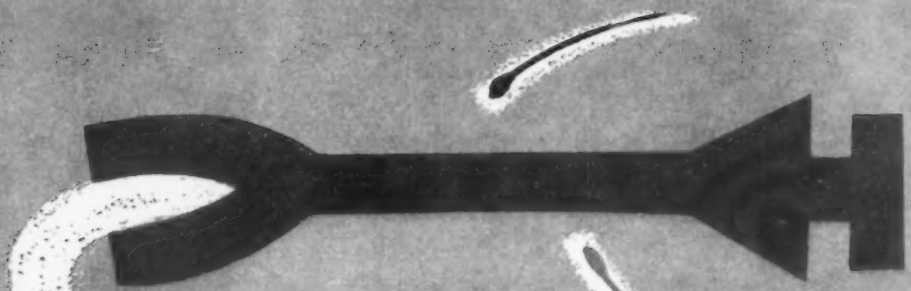
PATHOLOGIST-BACTERIOLOGIST: M.S., B.S. (London University); M.R.C.S. (England) L.R.C.P. (London). Age 42, family; registered with British General Medical Council. Five years experience in general and clinical pathology and bacteriology, London, England. Completing 3-year contract in Jamaica. Desires academic appointment in U.S., preferably in the South. Available May, 1959. Address: A-397.

VIROLOGIST-PATHOLOGIST: Excellent experience and background in infectious diseases, human and animal viruses. Broad interests include cancer and pathogenesis. D.V.M.–Ph.D., age 34. Presently in industry. Desires research and teaching position. Would consider Senior Fellowship. Address: A-398.

INTERNIST-HEMATOLOGIST: Age 36, Board certified, with five years academic-type practice and previous research experience, seeks academic position in moderate sized city. Address: A-399.

PSYCHIATRIST: Female, age 26, completing final year of residency in June 1959. Training includes two years in an active university program and participation in family studies in schizophrenia. Analytically (Sullivanian) oriented. Special interests: Psychotherapy with schizophrenics, teaching professionals and non-professionals, liberal arts. Seeks position teaching in medical school with time for limited private practice. Interested in small university community. Address: A-400.

PHARMACOLOGIST: Ph.D., 1955; married, 3 children. Presently teaching pharmacology to medical students. Publications. Research interests: drug metabolism and toxicology. Desires teaching appointment in medical school that would provide opportunity for completion of courses leading to M.D. degree. Would continue teaching pharmacology after receiving the degree. Availble August 1. Address: A-401.



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INTERNIST: M.D. Age 33. Currently on faculty of eastern medical school. Experience in private practice and industrial medicine. Eight months experience and training in psychiatry. Desires faculty appointment with opportunity for clinical investigation in cardio-vascular diseases, as well as teaching general medicine, in teaching hospital. Address: A-402.

PATHOLOGIST: Wishes to join Pathology Department to contribute to, or help develop, a strong, well balanced teaching program with emphasis on best utilization of materials, methods and communication with students. Also interest and experience in basic research. Previous experience in undergraduate, graduate, and medical teaching, including several years in Anatomy (Ph.D.), followed by M.D., internship and specialization in Pathologic Anatomy (will complete July '59). Age 38. Desires permanent position with good opportunities in primary fields of interest. Address: A-403.

VETERINARIAN: Experienced in microbiological techniques; presently at a medical school. Desires position as director of experimental animal laboratory. Address: A-404.

MICROBIOLOGIST-VIROLOGIST: Ph.D., presently on university faculty. Five years experience in virology and tissue culture publications. Desires academic position involving full-time research or research and teaching. Address: A-405.

ORTHOPAEDIC SURGEON: 38. Wants appointment in U.S.A. or Canada. Main interest in Traumatic Surgery and Research. Now holding consultant post at well known British Hospital. Mastership in Surgery and Fellow of the Royal College of Surgeons. Address: A-406.

PSYCHIATRIST-NEUROPHYSIOLOGIST: M.D. Certified in psychiatry and as a mental hospital administrator. FAPA and FSPA. No formal training in neurophysiology but using some of its principles with gratifying results in coping with the manifold problems of psychosomatic medicine. Desires full-time career teaching position in medical school with opportunities for teaching psychiatry; for learning clinical neurophysiology well enough to instruct; and for carrying on more intensive course of clinical investigation. Address: A-407.

PHYSIOLOGIST: Ph.D., 1957, age 31, married, one child. Research in cardiovascular-renal physiology. Strong background in hypertension. Eleven publications. Experience in teaching medical, dental, and pharmacy students. Desires research position with or without teaching responsibilities. Address: A-408.

MICROBIOLOGIST: Ph.D., Sept., 1959. Training in all fields of basic microbiology, with research in microbial metabolism. Desires faculty position with teaching and research opportunities in a university or medical school. Address: A-409.

PHYSIOLOGIST-ENDOCRINOLOGIST: Ph.D., age 36. Training and background in endocrine, cellular, mammalian and zoological physiology. Presently assistant professor engaged in teaching and research in endocrinology and general physiology. Formerly research associate in biochemistry. Desires academic and/or research position. Address: A-410.

ANATOMIST: Age 34, married. Ph.D. Anatomy 1957. Publications. Teaching experience in Eastern medical school. Desires teaching position with opportunity for research. Address: A-411.

INTERNIST: Age 35, married. Ten years training in internal medicine and hematology. Teaching experience and research in field of clinical hematology, B_{12} metabolism, radioactive uptakes, experimental hematology, and enzyme studies. Desires teaching position with opportunity for research. Address: A-412.

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*Carter, S.: *M. Clin. North America*: 315 (March) 1953.

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